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Thesis for PhD with The Open University

*The Codification of Pitch Organisation
in the Early Atonal Works of Alban Berg*

Volume 1: Text

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Abstract

There has recently been an unprecedented flurry of interest in the music of Alban Berg, although responses towards his first atonal works remain relatively sparse. This thesis presents detailed analyses of the pieces written between 1909 and 1913: the fourth Opus 2 song, the String Quartet, Opus 3, the *Altenberglieder*, Opus 4, and the Four Pieces for clarinet and piano, Opus 5. It also provides a systematically-developed theoretical framework for each.

Analyses of the String Quartet and the *Altenberglieder* explore the development and transformation of motives, and identify different aggregate systems which temporarily limit the range or arrangement of pitches to certain defined scales, such as the whole-tone or octatonic, or to the interaction between different scales or different versions of the same scale. The Four Pieces for clarinet and piano require a rather different form of investigation, into the interrelationship between intervallic cell and pitch-class set and genera-based material. A factor consistent across all four works is the presence of symmetrical pitch structures such as interval cycles, wedge formations and transpositionally invariant sets. The analyses are based on these foundations, while extending beyond them to incorporate related asymmetries and more complex relations and transformations.

Any codification of pitch organisation in these early atonal works of Berg has to contend with their particular complexities of expression and absence of any calculated method; this thesis nevertheless proposes several forms of categorisation which can correlate with many of the myriad pitch structures in the music, and which can in turn supply models for some of the discernible interrelational structural processes.

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Chapter 1

Introduction: analytical approaches to the pitch organisation of Alban Berg's early atonal works, and their theoretical bases

The creative context within which Berg wrote his early free atonal works embraced expressionism, total thematicism, and, conversely, aphoristic form, where extended and regular structures were avoided; but this was an environment where innovation and singularity were tempered by a traditional Austro-German background. In all of these aspects, there was a strong correlation between Berg's music and that of Schoenberg, with whom Berg studied until 1910, and Webern. Berg's first numbered opus, the Piano Sonata of 1908,¹ was also his first work to move decisively away from unequivocal tonality and towards a suspension of traditional triadically-based harmonies and unambiguous harmonic relations, a process which was then fulfilled progressively through the first three of the Four Songs for voice and piano, Opus 2.²

I have chosen to study the subsequent group of Berg's works, comprising his first atonal composition, the fourth of the Four Songs for voice and piano, Opus 2, of 1909, the String Quartet, Opus 3, of 1910, the Five Orchestral Songs (The *Altenberglieder*), Opus 4, of 1912, and the Four Pieces for clarinet and piano, Opus 5, of 1913. While there has recently been an unprecedented flurry of interest in the later works, particularly the operas, the response to these earlier works remains relatively sparse. This thesis aims to search for some of those 'intricate technical secrets of Berg's compositions [which] only reveal

¹Opus 1 is amply described in Theodor W. Adorno, *Alban Berg: Master of the Smallest Link*, trans. by Juliane Brand and Christopher Hailey (Cambridge: Cambridge University Press, 1991), pp. 40-46, and in Janet Schmalfeldt, 'Berg's Path to Atonality: The Piano Sonata, Op. 1', in *Alban Berg: Historical and Analytical Perspectives*, ed. by David Gable and Robert P. Morgan (Oxford: Oxford University Press, 1991), pp. 79-109.

²The break-down of tonality was simultaneously evolving, in varying degrees and ways, in the music of Stravinsky, Bartok, Debussy, Scriabin, Mahler and Strauss, as well as in the more closely-related explorations of Schoenberg and Webern.

themselves after long and patient study',³ the structural principles of which 'may still be discovered in this music'.⁴

The new atonal style of the Second Viennese School (i.e. of Schoenberg, Webern and Berg) was based on the precepts that the twelve notes of the chromatic scale were equally related among themselves and that dissonances were 'emancipated' from the need to resolve. A common factor within the pitch-composition of Berg's Opus 2, 3, 4 and 5 was, nevertheless, the presence of invariant pitches and collections, of aggregate collections, and of symmetries such as interval cycles, wedge formations and arch forms. Berg's propensity for symmetrical structures became one way of compensating for the withdrawal of tonal functions, and of supplying normative restraints within a freely expressive style.

This thesis aims to present a thorough analysis of the pitch organisation of each work, in substantially greater depth than has been provided elsewhere. There will, moreover, be a strong systematically-developed theoretical background to the analyses, where a periodic expansion and refinement of notions will lead towards the categorisation of note groupings into notional systems, delineating the perceived principles of organisation. Although due regard will be given to the theoretical basis of recent Berg study, discussion will tend to have an empirical and work-specific bias, reflecting a presumption that each work's compositional complexities will require and demand an individual model for its underlying structural processes. To some extent each piece will choose its own form of analysis: George Perle has stated that analytical rightness 'depends ... upon larger compositional factors whose meaning must be discovered within the work itself' and that the 'defining ... and differentiating ...[of] material ... is uniquely presented and solved in each atonal work';⁵ each piece will accordingly tend also to suggest the theoretical basis for its own elucidation.

³Douglas Jarman, Preface to Douglas Jarman, ed., *The Berg Companion* (Houndmills: Macmillan, 1989), page viii.

⁴George Perle, *Serial Composition and Atonality: An Introduction to the Music of Schoenberg, Berg and Webern*, 2nd edn. (London: Faber, 1968), page 34.

⁵*Ibid.*, page 9.

One complete chapter has been devoted to each of the works. Within each chapter a general three-part pattern of subject headings has been followed, discussing firstly the work's reflexively referential material (such as motives) in relation to its overall formal design (each chapter's Part A), followed by a consideration of Berg's use of normative/pre-compositional (often symmetrical) forms of organisation (each Part B), and finally leading to a proposed complex of structural networks borne of these and other structural units (each Part C). The Conclusion (Chapter 6) is organised differently: numbered sections deal with salient areas of general summing up.

In drawing from a number of different theoretical sources, I have inevitably had to use a corresponding variety of different forms of descriptive terminology. In order to compare groupings of notes, for instance, I have often used Forte's pitch class (pc) names,⁶ and in doing so I have made appropriate assumptions about the membership-by-association of any sets given the same name, regardless of transposition level or ordering of notes. The principal pc set relations employed in this analysis are those of inclusion⁷ and complementation;⁸ the interval pattern of pcs for a set, e.g. (0,1,6,7) for 4-9, is a description of that set's distinguishing 'close' formation of intervals (called 'prime form' or 'normal order' by Forte).⁹ In describing inversional symmetries, I have adopted Perle's sum symmetrical axes,¹⁰ and his 'PI dyads'.¹¹ Interval cycles have been designated 'interval-1 cycle' for the semitonal scale, etc.;¹² transpositions of motives, etc. are likewise named T-1, etc. from their normal or initial pitch level for the work, and intervals are named ic 1 for a semitone, etc. The three octatonic scales are named Coll 1 (C#-D-E-F-G-A^b-B^b-B), Coll 2 (D-E^b-F-F#-G#-A-B-C) and Coll 3 (D#-E-F#-G-A-B^b-C-C#), after Van den Toorn.¹³ All references to the notes of transposing instruments are at sounding pitch.

⁶Allen Forte, *The Structure of Atonal Music* (New Haven: Yale University Press, 1973).

⁷*Ibid.*, page 25.

⁸*Ibid.*, pages 73-74.

⁹*Ibid.*, pages 3-5.

¹⁰As outlined in George Perle, *The Operas of Alban Berg: Volume Two/ 'Lulu'* (Berkeley: University of California Press, 1985), pages 167-168.

¹¹*Ibid.*, page 167.

¹²*Ibid.*, page 165.

¹³Pieter C. Van den Toorn, *The Music of Igor Stravinsky* (New Haven: Yale University Press, 1983).

Labelling 'types' for themes, motives and cells will be kept distinct for each of Opus 3, 4 and 5, i.e.

- *a1, a2*, etc. after Archibald for the first movement of Opus 3¹⁴
- *ritornello, marcato* theme, etc. for the second movement of Opus 3
- Greek letters (and Roman numerals) after DeVoto for Opus 4¹⁵
- Roman numerals after Jarman for Opus 5¹⁶

Structural names and defined titles are generally given an initial capital letter, e.g.

Development section and Diatonic system; other defined items are often expressed within quotation marks or, exceptionally, in italics, e.g. 'referential pitch pairs' and 'significant' tetrachords, '*head*' motive and *initial phrase*.

At a late stage in the preparation of this thesis, with all of Chapters 2 to 5 completed, a major study of Berg's music by Dave Headlam was published.¹⁷ While my investigations do not encroach greatly on Headlam's analyses, inevitably there is some duplication of material.¹⁸ Headlam's method is primarily founded on 'the premise of a normative structure based on symmetry and cycles',¹⁹ where cyclic systems centre on whole-tone (interval-2, 4 and 6) cycles, together with their related whole-tone-plus collections, and on contrasting odd (interval-1, 3 and 5) cycles, together with their related odd-plus collections.²⁰ My approach spreads a wider net, placing greater emphasis on motivic and cell-based connections, on aggregate systems, and on generative networks of related pc sets, while laying far less emphasis on long-term prolongational influences (evident in Headlam's analyses through his principal normative 'consonances', and consequentially contrasting

¹⁴Bruce Archibald, 'Berg's Development as an Instrumental Composer', in *The Berg Companion*, ed. by Douglas Jarman (Houndmills: Macmillan, 1989), pp. 91-122 (pages 97-104).

¹⁵Mark DeVoto, 'Some notes on the Unknown "Altenberg Lieder"', *Perspectives of New Music*, Vol. 5, No. 1 (1966), 37-74.

¹⁶Douglas Jarman, *The Music of Alban Berg* (London: Faber, 1979), pages 23 and 25.

¹⁷Dave Headlam, *The Music of Alban Berg* (New Haven: Yale University Press, 1996).

¹⁸His analyses are also selective: he has little to say, for instance, about the second movement of the Opus 3 String Quartet.

¹⁹*Ibid.*, pages 10 and 61; Headlam sees the move towards atonality in Opus 2, for instance, as being facilitated by 'cyclic tonality' (*ibid.*, page 33).

²⁰*Ibid.*, pages 68 and 73.

'dissonances'²¹). All correspondences of viewpoint between this thesis and Headlam's book have been registered in the footnotes, while discussion of some of the major differences of approach have been inserted at appropriate points into the text.

²¹Ibid., pages 10, 61, 63, 64 and 67.

Chapter 2

The Four Songs, Opus 2, for voice and piano, and Berg's move towards atonality

Part A. The first three of the Four Songs, Opus 2: their structure and tonal focus

All four songs have attracted the attention of analysts, from Adorno to Jarman, Samson, DeVoto, Kett and Headlam.¹

The first song, *Schlafen, Schlafen*, is in an unequivocal D minor, but incorporates many chromatically-altered dominant seventh and ninth chords, sometimes with both major *and* minor third and with perfect fourth sited above augmented fourth/diminished fifth;² the earliest chord of this type, in the first half of bar 5, a 'dominant seventh with major and minor third' (i.e. D-F#-C-F from the bass upwards), is identified by Kett as a unifying chord for all four songs (transpositions reappear in the fourth song's progression of bars 20-22),³ while the chord's augmented fourth-plus-perfect fourth element returns as a prominent motivic cell in the third song (i.e., at its first appearance, the piano's C-G-Db in bar 2). Other non-triadic formations include a French sixth (C#-G-B-F) on the first semiquaver of bar 11, a fourths chord (B-E-A-D-G-C) on the fourth quaver-beat of bar 18 (and on the fifth quaver-beat of the following bar), and whole-tone harmony in bar 11 (first C#-G-B-F-Eb, with a 'dissonant' appoggiatura Bb resolving to A in the voice, and then F#-E-Bb-D). All of these harmonic configurations will reappear in an *atonal* context in the

¹T. W. Adorno, op. cit.; D. Jarman, op. cit., pages 31-32; Jim Samson, *Music in Transition: A Study of Tonal Expansion and Atonality 1900-1920* (London: Dent, 1977), pages 121-125 and 178-180; Mark DeVoto, 'Berg the Composer of Songs', in *The Berg Companion*, ed. by Douglas Jarman, op. cit., pages 35-66, and 'Alban Berg and Creeping Chromaticism' in *Alban Berg: Historical and Analytical Perspectives*, ed. by David Gable and Robert P. Morgan, op. cit., pp. 57-78 (pages 68-70); Steven Kett, 'A Conservative Revolution: The Music of the Four Songs op. 2', in *The Berg Companion*, ed. by Douglas Jarman, op. cit., pp. 67-90 (pages 71-84); D. Headlam, op. cit.

²See Mosco Carner, *Alban Berg: The Man and the Work* (London: Duckworth, 1975), page 84.

³Op. cit., page 71.

fourth song: here, though, the syntax is such that they arise through the contingencies of tonal preparation/resolution and the chromatic movement of parts.

The second song, *Schlafend trägt man mich*, retains a key signature (Eb minor),⁴ but is totally innovative in its systematic and non-tonal procedures using French sixth and other whole-tone harmonies, and incorporating the unfolding of simultaneous cycles of rising fourths and falling semitones (in bars 1-4 and 15-17). Perle, Ayrey and Jarman have all contributed to the explication of these procedures,⁵ while Jarman has uncovered the almost wholesale use (during 14 of the song's 18 bars) of a transpositional cycle of the six different French sixth tetrachords (at T-5 or T-11), including retrograde orderings of the cycle in bars 4-7 and 13-14.⁶ DeVoto has made the associated observation that the vertical whole-tone harmony is offset by horizontal chromatic writing (in order to effect the alternation between whole-tone groupings); it can be added that 'odd-numbered' non-whole-tone intervals other than the semitone (i.e. ic 3, the minor third, ic 5, the perfect fifth, etc.) are also a feature of the linear dimension, e.g. the rising fourths in the bass at the start and close, and the falling minor third and perfect fourth of the 5-note figure in bars 9-10 (voice) and 10-11/12-13 (piano, right hand), this figure being itself a realignment of the bars 1-3 piano treble line. The French sixths' function as quasi-dominant sevenths in bars 1-4 and 15-16 leads the final example of this chord (Eb-Db-G-A, in the final two bars) to act as a 'dominant seventh' to the next song's Ab minor;⁷ in Samson's view, this second song presents a successful early essay in the treatment of the twelve pitches as 'equally related among themselves'.⁸

⁴According to Headlam, op. cit., page 41, a 'key' of Eb causes the opening Bb-based French sixth (and subsequent versions of this collection) to function as its dominant.

⁵George Perle, 'Berg's Master Array of the Interval Cycles', *The Musical Quarterly*, Vol. 63, No. 1 (1977), 1-30 (page 3), and *The Operas of Alban Berg: Vol 2, 'Lulu'*, op. cit., pages 161-162; Craig Ayrey, 'Berg's "Scheidewig": Analytical Issues in Op. 2/2', *Music Analysis*, Vol. 1, No. 2 (1982), 180-202 (pages 189-202); Douglas Jarman, 'Alban Berg: The Origins of a Method', *Music Analysis*, Vol. 6, No. 3 (1987), 273-288 (pages 285-288).

⁶Ibid., pages 285 and 287.

⁷J. Samson, op. cit., page 124.

⁸Ibid., page 145.

The third song, *Nun ich der Riesen Stärksten überwand*, again employs a key signature (Ab minor),⁹ moving to D minor (the principal key of the first song) in bars 7-9,¹⁰ and finishing on the dominant of Ab minor (as did the second song). There is one French sixth, Ab-F#-C-D, on the fourth quaver of bar 9;¹¹ otherwise, there is an abundance of conventionally triadic seventh harmonies, perfect fifth pedals, and octave doublings in the piano left hand. The principal motive (first stated in the piano, bar 2) provides opportunities for tonal ambiguity and modulation: in bar 2, the motive's C natural acts as an Ab *major* mediant degree, and is set against the voice Cb (Ab *minor*'s mediant degree); in bar 4, the submediant Fb on the final crotchet becomes a root E in bar 5 (there are corresponding enharmonic changes in the voice and piano's treble, from Eb to D#, from Ab to G#, and from Cb to B); in bar 5, the motive's G natural, D natural and G# act as seventh and major and minor third to the bass E, anticipating in construction the second, fourth and sixth of the chords from bars 20-22 of the fourth song (all of which use the identical tritone-plus-fourth structure in the right hand). At the reprise of material in bars 9-11, the motive's submediant Fb at bar 11 now contributes differently, to a whole-tone sonority on the final two triplet quavers of the bar, and then falls conventionally to a dominant Eb in bar 12; an echo of the motive's dotted figure at the end of bar 12 incorporates an Ab, a reminder of the song's 'home' key.

⁹Carner gives Cb major as the 'key', op. cit., page 85.

¹⁰Headlam prefers to lay more emphasis on a secondary key area on A, found in bar 6 between the E-based harmonies of bar 5 and the D minor of bars 7-9, op. cit., pages 43-44.

¹¹S. Kett, op. cit., page 83.

Part B. Reflexive reference in *Warm die Lüfte*, Opus 2, No. 4

1. Cell associations and their derivation from the opening four bars

The melodic aspect of this fourth song has variously been described as being 'athematic' (Carner),¹² 'intuitive' (Samson),¹³ and 'subconscious' (Samson¹⁴ and Adorno);¹⁵ in this respect, comparisons have been made with Schoenberg's contemporary works, *Erwartung* and *Das Buch der hängenden Gärten*. The vocal line has further been described as having a role largely independent of the piano part.¹⁶ Certainly, Berg is careful to avoid unison and octave doubling between instrument and voice,¹⁷ and most of the vocal phrase-constructions use a combination of rising *and* falling intervals, in contrast to the piano's uniquely rising *or* falling phraseology. There are, however, some important motivic and cell-like correspondences shared by both, operating throughout the song.¹⁸

The principal motivic cells are

- a rising and then falling major second,¹⁹ initially C-D-C in the piano's treble in bars 1-2, also mirrored in inversion (and imitated) by the piano's 'tenor' C#-B-C#-D#-C#: this cell recurs in bars 5-6, representing the nightingale, both as a setting for the word '*Nachtigall*' (Eb-F-Eb)²⁰ and as an imitation of the bird's song in the piano's high treble (F#-G#-F#, reiterated several times); the cell appears again in the voice in bar 15 on the words '*Er kommt noch nicht*'

¹²Op. cit., page 84.

¹³Op. cit., page 125.

¹⁴Ibid., page 125.

¹⁵Op. cit., page 47.

¹⁶e.g. by S. Kett, op. cit.

¹⁷Apart, that is, from instances at the start and end of the song, in bars 3-4, where the voice and piano 'tenor' rise in octaves from D# to E at the barline, in bars 4-5, where vocal Fs are placed against a reiterated F in the piano, in bars 20-21, where the voice's C# and G at the barline are placed an octave above the same pcs in the prevailing piano chord, in bar 22, where Eb occurs in both parts, and in bar 24, first crotchet beat, where F occurs in voice and piano left hand.

¹⁸Headlam, by contrast, finds 'little repetition of musical figures after their initial presentation', op. cit., page 128.

¹⁹Noted also by Headlam, op. cit., page 168.

²⁰Perhaps derived from the same figure in the vocal part of bars 8-9 of the third song (noted by Headlam, op. cit., page 168, who also links the motive to the first song).

- a rising tritone, first heard as F#-C²¹ at the centre of the first four-note vocal phrase, in bar 2: this cell is a feature of the rising elements of the second vocal phrase in bar 3 (G-C#, and then A-D#, with an intervening C);²² the similarity here extends to both tritones having an antecedent rising semitone, creating the shapes F#-G-C# and G#-A-(C)-D#; the cell reappears in descending form in the piano, in bars 6-8 (B-F in bar 6, and then Eb-A, sounded four times), and is then converted first into harmonic fifths descending/ascending in tritones, in bars 10-12 (C# to G and F# to C, in the treble and then the bass of the piano) and later into harmonic major thirds descending in tritones, in bar 17 (Bb to E and Gb to C, extending downwards over the space of three octaves); these latter instances of *parallel* tritones form transpositionally and inversionally-invariant tetrachords, i.e. pitch class set 4-9, with the interval formation (0,1,6,7), in the case of the F#-G-C-C# of bars 10-12, and pc set 4-25, with the profile (0,2,6,8), in the case of the Bb-C-E-Gb of bar 17²³
- a melodic minor sixth,²⁴ initially represented by the falling C-E in the opening vocal phrase, in bar 2, but becoming a recurrent *rising* feature in the ensuing phrases:²⁵ G#-E in bars 3-4 (the outer notes of the symmetrically-spaced group G#-A-C-D#-E), E-C and G-Eb in bars 5-6 (the first of these the retrograde of the original of bar 2), F#-D in bar 7 (with the first three notes of this phrase, G-F#-D clearly imitating the first three notes of the bar 5 phrase, F-E-C²⁶), and G#-E in bar 11 (with the final three notes of this

²¹c.f. Headlam's C/F# recurring motive, op. cit., page 171.

²²The rising tritone also features strongly in the first song, e.g. as early as bar 3 in the piano's bass and bar 4 in the voice, and in the rapidly-rising figures of bars 11-13, and in the second song, i.e. in the bass phrases of bars 16-17 (these phrases are themselves a 'mutation' of the rising minor sixth figure from earlier in this second song (bars 4-8 and 11-12) *and* represent a recurrence of the '*nichts als Schlafen!*' shape from bars 4-5 of Song 1).

²³Known respectively as the '*Lulu*' and 'French sixth' cells. The only other transpositionally-invariant tetrachord, 4-28 (0,3,6,9), the 'diminished seventh', is also formed from tritones, in parallel or overlapping minor thirds (an instance occurs harmonically on the second crotchet beat of bars 1 and 2, i.e. the piano's F-B-Ab-D): see D. Jarman, 'Alban Berg: The Origins of a Method', op. cit., pages 285-286. Headlam (op. cit., pages 173-4) places these three sets among the 'characteristic features' of Berg's first atonal compositions, due to their mediating role between different harmonic areas.

²⁴Some of these are recognised by Headlam, op. cit., page 168: he relates his motive of rising minor third-falling tone/semitone to the opening vocal phrase of the second song, bars 2-3.

²⁵As a rising motive, the minor sixth is clearly derived from the vocal figure F-Db of bars 2 and 14 in the second song, also prominent in bars 4-8 and in bar 11, and itself a linear form of this second song's semitonally descending interlocking minor sixths observable during the French sixth progression of bars 1-4 (see C. Ayrey, op. cit. page 199); the rising minor sixth figure occurs also in the third song, in bars 9-10 (i.e. the piano's D-Bb-Eb-B-E-C).

²⁶Again, this three-note motivic figure is derived from the rising minor sixth (with its attendant falling semitone) of the second song, prevalent in bars 4-8 and 11-12.

phrase, G[#]-E-D, providing an invariant repetition of the G[#]-(A-C-D[#])-E-D at the end of the bars 3-4 phrase); the F[#]-D pair recurs in the piano's treble in bar 22, as Gb-D (in fact, the phrase Ab-Gb-D is a T-2 retrograde of the voice's 4th, 5th and 6th notes from bars 2-3, C-E-F[#]),²⁷ and there is a descending form, D-F[#], in voice's final phrase, in bar 23

More transformational are the development of

- the piano's rising/falling tones of bars 1-2 into a predominantly semitonal oscillation of parts in the chords of bars 9-10²⁸
- the piano's rising parallel minor sevenths in bars 3-5 into falling, then rising minor ninths in the bass between the final crotchet of bar 14 and the third crotchet of bar 16²⁹

Further elements have been shown to refer specifically to features from earlier songs in Opus 2:

- the second and fourth chords of the bars 20-22 sequence are transposed repetitions of the chord found at bar 5 in the first song,³⁰ i.e. 'dominant sevenths with major and minor third' (pc set 4-Z15: 0,1,4,6), as is the final chord of the sequence, but now with the added fifth in the bass (repeated in bars 23-25, and forming pc set 5-32: 0,1,4,6,9)³¹
- the upper three notes of each of the chords in the bars 20-22 sequence consist of the tritone-plus fourth sonority originating from the same chord from the first song, and from the principal motive of the third song;³² the sonority here descends in semitones with each successive chord³³

²⁷There is a further instance of this pc set 3-8 shape in the voice's G[#]-E-D of bar 11.

²⁸This dichotomy between rising/falling tones and rising/falling semitones is a reversal of that found in the first song, where vocal semitones in bars 10-12, reflecting the minor mode, become tones at the bars 15-16 climax, before reverting to semitones in bars 21-22.

²⁹Falling parallel minor sevenths have previously occurred at the end of the second song, in bar 16.

³⁰S. Kett, op. cit., page 71.

³¹Noted also by Headlam, who also identifies two other instances of the chord in *Wozzeck* and *Lulu*, op. cit., page 33, and note 101, page 419. This final chord of Opus 2 No. 4 is very similar in its harmonic construction to the reiterated opening chord of the fourth of the Four Clarinet Pieces, Opus 5: the song's chord has a root, fifth, major and minor third and *minor* seventh, while the clarinet piece has root, fifth, major and minor third and *major* seventh. Interestingly, the Opus 5 chord is rooted on C, as is the fourth song's opening chord, whereas the song's closing chord has dropped a semitone to B: Samson (op. cit., page 124) calls this discrepancy between otherwise similar chords a 'remote Neapolitan relationship'; the return to a C-based chord in the clarinet piece represents, perhaps, an even more remote reversal of that relationship.

³²S. Kett, op. cit., pages 72-73; this vertical cell is a common one in music of this period: the opening three

- French sixths have appeared in each of the previous three songs³⁴ (those in this fourth song are discussed later)
- the perfect fifths in the bass at bars 1-3 (C-G), bars 5-6 (C-G), bars 9-12 (G-D, A-E, C-G and F#-C#) and bars 22-25 (B-F#) each have a temporary tonicising effect, and are therefore reminiscent of the bass fifths in the first and third songs³⁵

2. Invariant pitches

A disparate collection of common invariants are³⁶

- Bb, F# and C, the voice's first three pitches, which return as a group in the final vocal phrase, in bar 23
- the tritone Eb-A of bars 6-8, which reappears as the lower part of the piano's reiterated right-hand chord of bars 15-16
- the minor ninth A-Bb, which is prominent in the piano's right hand from the third crotchet of bar 15 to the third crotchet of bar 16 (in falling octaves), and is inverted in bar 19 to form a compound major seventh (Bb in the deep bass, and A on the word *Stirb!*)
- the tritone C-F#, which is reiterated as the first two notes of each of the three-note phrases contained within the right-hand pitch content between the fourth crotchet of bar 12 and the third quaver of bar 15; the other right-hand elements rise semitonally with each statement of the phrase- a process which De Voto describes as 'incremental expansion'³⁷

notes of Berg's Opus 1 Piano Sonata use it (a rising G-C-F#), and it is also an important element in his Opus 3-5- see J. Schmalfeldt, 'Berg's Path to Atonality: The Piano Sonata, Op. 1', op. cit., pages 92-94, and Chapter 5 of this thesis.

³³As did the sonority in the right hand of the piano in bars 7-8 of Song 1: see D. Jarman, *The Music of Alban Berg*, op. cit., page 30.

³⁴See S. Kett, op. cit., pages 80 and 82.

³⁵M. Carner, op. cit., page 84

³⁶Headlam, op. cit., has a few other worthwhile suggestions:

- an invariant F/D/F#/Bb/C# (pc set 5-21) between the vocal final phrase and the song's penultimate chord
- the tritones C/F# and E/Bb combined in the opening vocal phrase and in the descending parallel-thirds tritones of bar 17

³⁷Op. cit., page 46.

- the pitches E, G, G#/Ab and B (forming pc set 4-17: 0,3,4,7), which occur together several times in the central part of the song, in bar 10 (the vocal Ab-E-G-(Eb-Db)-B-G-G#), in bar 12 (the piano's right-hand E-G# to G-B), and in bars 12-13 (the voice's G-Ab-E, E-G-G#-B-G, and Ab-G-E-B); the collection implies an E major/minor area within the more general 'atonal' progression of notes, particularly since the vocal statements of the group are attended in most cases by a lower Eb and Db (acting as 6th and 7th degree notes D# and C#), and since bars 13-14 are underpinned most of the time by E and D# in the bass (the focal pitches of a wedging process between 'tenor' and 'bass' lines)
- the chord B-F#-Eb-A-D, which acts as a referential 'final' sonority several times at the end of the song, initially as the final chord of the bars 20-22 sequence, and then as the second chord of each of three two-chord progressions in bars 22-24
- the piano sonority G-F-C#-Gb-Bb on the last semiquaver of bar 16, which relates to notes in bars 1-2, and at the same pitch level, i.e. G-F-C# in the piano and Bb-F# in the voice³⁸
- a pc set 6-16 phrase F-E-C-B-Eb-F-Eb in the voice, bars 5-6, whose pcs recur in the vocal phrase from the first half of bar 15, i.e. B-Eb-G-C-E-F³⁹
- a pc set 7-Z18 G#-A-C-D#-E-D-F in the voice, bars 3-4, whose pcs recur in the vocal part of bars 10-11, i.e. G#-A-Eb-C-F-G#-E-D

Part C. Symmetrical structures in *Warm die Lüfte*

In a recent article, Anthony Pople pleads the need for a 'theory of common practice' and a 'stock of recognisable generic musical artefacts' in the analysis of music of the early twentieth century, and in that of Berg's pre-serial works in particular.⁴⁰ Such 'generic musical artefacts' have elsewhere been termed 'normative' and 'pre-compositional' by

³⁸Headlam, op. cit., page 172, associates the Gb(F#)/Bb element of these with the Gb/Bb of the bar 9 piano chord.

³⁹This association is noted by Headlam, op. cit., page 172.

⁴⁰Anthony Pople, 'Secret Programmes: Themes and Techniques in Recent Berg Scholarship', *Music Analysis*, Vol. 12, No. 3 (1993), 381-399 (pages 396 and 397).

George Perle,⁴¹ and as a 'comprehensive system of pitch organisation' by Douglas Jarman.⁴² It is generally agreed by Perle, Jarman, Antokoletz and others that this systematic and generic approach to early twentieth century composition includes the use of material derived from interval cycles, from various other forms of inversive symmetry such as wedge-like formations, and from symmetrical configurations of limited transposition such as pc sets 4-28 (the diminished seventh tetracord), 4-25 (0,2,6,8: the French sixth) and 4-9 (0,1,6,7; the *Lulu* Basic Cell 1⁴³).⁴⁴

This song is a veritable compendium of such symmetrical formations, embracing interval cycle segments, wedge-like inversive constructions in contrary motion, and symmetrically-structured aggregate domains.

Interval cycles are represented in the song by

- chromatic movement of parts in the piano, especially in the second half
- whole-tone harmony, in the piano's treble in bars 6-8, and in bars 17-18
- rising fourths in the left hand of the piano set against falling parallel semitones in the right hand, in the bars 20-22 progression
- tritones, i.e. the tritone-based cell-like figures identified earlier, in bars 2-3, 6-8, 10-12 and 17

The song's principal wedge formation, shown in Example 2.1a, occurs in the piano's left hand during bars 12 to 14; the wedge appears to be initiated by the C-G fifth on the final quaver of bar 11, since the bass C of the fifth elides, through an octave displacement, with the 'tenor' C#-D, etc, while the G continues F#-F, etc. in the 'bass'. The wedge shows a formation whose vertical intervals are 'odd', i.e. ic 7 (the perfect fifth), ic 9 (the major sixth), ic 11 (the major seventh), etc.; all vertical dyads are inversive around the notes A and Bb (sum 7 PI dyads, in Perle's terminology): the two focal pitches of the wedge, A and

⁴¹In e.g. *The Operas of Alban Berg: Volume 1/ 'Lulu'*, op. cit., pages 198-199.

⁴²'Alban Berg: The Origins of a Method', op. cit., page 279.

⁴³See Perle: *The Operas of Alban Berg: Volume Two/ 'Lulu'*, op. cit., page 87.

⁴⁴Elliot Antokoletz, *The Music of Béla Bartók* (Berkeley: University of California Press, 1984).

Bb, are again cast against each other during bars 15-16 (as a minor ninth in the right hand of the piano), and once again as the only two pitches in bar 19. A shorter wedge, partly concurrent with the first one, occurs in the voice part during bars 14-15, starting on the note A; Example 2.1b shows that, with the exception of the low B, the formation is once again inversional around A-Bb, at sum 7.

The contrary motion *glissandi* in bar 15, with 'white key' notes in the left hand and 'black key' notes in the right (itself a form of wedge, starting and ending on B/A#) together create a twelve note aggregate.⁴⁵ An earlier instance of the full chromatic occurs in bars 6-8, where the final four notes of the piano's *flüchtig* figure, B-F-Eb-A (forming pc set 4-25) are followed by the remaining eight notes of the scale in the voice at '*Ich will singen:*', i.e. G-F#-D-C-E-Bb-G-G#-C# (forming pc set 8-25, 4-25's complement)

Alternations between the two whole-tone domains occur

- in bars 6-8, where the downward flourish imitating the nightingale changes from one whole-tone group, F#-G#-Bb-D, to the other, Eb-F-G-A-B, followed by a sequence of notes from the first whole-tone collection, in the voice, i.e. F#-D-C-E-Bb
- in bar 15, where the white and black-note *glissandi* are arranged in vacillating vertical whole-tone blocks, F-G-A-B-C#-D# and C-D-E-F#-G#-A#

The two whole-tone areas are vertically superimposed in bars 1-2, with G-F-B-C#-D# from one collection in the left hand of the piano and a registrally distinct Ab-Bb-C-D-E-F# in the piano's right hand and in the voice.⁴⁶

⁴⁵Headlam identifies later instances of 'black' vs. 'white' segments in Act 2, Scene 4 of *Wozzeck* and in the Lyric Suite and *Lulu*, op. cit., pages 419-420, note 105.

⁴⁶The bass C is foreign to the left-hand whole-tone collection, however. Controversy has recently surrounded these opening bars: Kett's assertion (op. cit. page 82) that bars 1-2 simultaneously use both whole-tone collections elicited a response from Anthony Pople (op. cit., pages 392-393), pointing out that other, quasi-tonal or bitonal interpretations may offer more plausible views of the compositional process (N.B., similar superimposed triads occur in bars 9-10 and 22-24); Pople's article resulted in further correspondence, from Christopher Wintle ('Recent Berg Scholarship: Responses to Anthony Pople', *Music Analysis* Vol. 13, Nos. 2-3 (1994), 310-312), which suggested that all three functions (superimposed whole-tone, tonal and a 'Neapolitan' form of bitonality) could be operating together symbiotically. (Headlam, incidentally, subscribes to the 'superimposed whole-tone groups' interpretation, with a tonally-stabilising 'foreign' bass note C). The present survey suggests, rather, that each of the three processes is paradigmatic for those of the whole song, such that the opening bars serve as an adaptable blueprint or *Grundgestalt* for the whole, presenting many of

Two further symmetrically-formed 'scales' act as aggregate domains in parts of the song:⁴⁷ the octatonic, which consists of alternating semitones and tones (i.e. 0,1,3,4,6,7,9,10: pc set 8-28), is ostensibly formed either from overlapping diminished sevenths (0,3,6,9: 4-28), overlapping French sixths (0,2,6,8: 4-25) or overlapping 'Lulu' basic cells (0,1,6,7: 4-9), and the hexatonic, which consists of alternating semitones and minor thirds (i.e. 0,1,4,5,8,9: pc set 6-20), and is formed from overlapping augmented triads (0,4,8: 3-12); the distinct transpositional forms of these scales (three for the octatonic and four for the hexatonic) are shown in Example 2.2. These two collections can also be formed through the overlapping of certain symmetrical tetrachords, creating 'zigzag' formations, i.e. pc sets 4-17 (0,3,4,7) and 4-3 (0,1,3,4) in the case of the octatonic, and 4-7 (0,1,4,5) and 4-20 (0,1,5,8) in the hexatonic; these formations are shown in Example 2.3.

Octatonic groupings are to be found in bars 1-4, in bars 8-17, and in bars 21-22; principal occurrences are shown in Example 2.4. Of note are

- a Coll 1 sequence, in the voice part throughout bars 12-14:⁴⁸ this presents contiguous groups (pc sets 6-27 and 7-31) together containing all eight notes of the scale, but separated by one note, Eb, foreign to the collection; of significance here are the pitches E-G-G#-B (pc set 4-17), noted earlier as being an invariant 'E major/minor' group which appears also in the vocal part in bar 10 and in the piano in bar 12⁴⁹ (Example 2.4a)
- a Coll 3 sequence, in the vocal part of bars 1-4, with contiguous 6-30 (Bb-F#-C-E-F#-G-C#: 0,1,3,6,7,9) and 4-18 (A-C-D#-E: 0,1,4,7) segments, separated by a 'foreign' G# (Example 2.4b)
- the unfolding of a scalic segment from Coll 2, in the vocal part in bars 21-22, on the words '*daneben der Andere lebt*:', i.e. G#-A-B-D-C-Eb (pc set 6-Z13, 0,1,3,4,6,7); this

the song's cell-like motives, invariant pitch groups and symmetrical arrangements in embryonic form.

⁴⁷Aggregate domains of less than the customary 12 notes are more fully explored in Part B.3 of Chapters 3 and 4.

⁴⁸The first two notes, Db-C, of the voice's phrase, at the barline between bars 11 and 12, do not conform to Coll 1, but are instead associated with the piano's prevailing motion, C/G to F#/C#, helping to lend a 'structural' significance to this event.

⁴⁹In this context, the 'foreign' Eb acts as a passing-note D#, as it does in bar 10.

six-note 'scale' is presaged, a minor sixth higher, by the piano's rising treble line of bars 3-4, i.e. E-F-G-Ab-Bb-B, from Coll 1 (Example 2.4c)

- two predominantly vertical 5-28 groupings (0,2,3,6,8) in the piano, one at the end of bar 12 (F-D-Ab-C-F#, Coll 2) and the other at the start of bar 14 (E-D#-Bb-C-F#, Coll 3), each of which simultaneously incorporate elements from the left-hand wedge and the rising right-hand phrases; both feature a subset 4-25, the French sixth, the second of which is invariant with the voice's first four notes and with the bar 17 collection (Example 2.4d)
- the chords of bars 20-22: these alternate between pc sets 4-Z29 (0,1,3,7) and 4-Z15 (0,1,4,6),⁵⁰ and follow the sequence Coll 1, Coll 3, Coll 2, etc. until the final chord of the series is reached (pc set 5-32, 0,1,4,6,9, Coll 2)- see Example 2.7
- an earlier instance of pc set 5-32,⁵¹ from the voice part of bars 10-11, i.e. G#-A-Eb-C-F-G#, also Coll 2: the first four pitches of this phrase segment (pc set 4-18) form an invariant link with the same four pcs in the voice at bar 3,⁵² and also with notes 1, 2, 5 and 6 of the voice's bars 21-22 scalar group (Example 2.4e)
- the chord on the third beat of bar 15: C-Db-A-Eb-Gb-Bb, Coll 3

Hexatonic groupings centre around instances of pc sets 5-21 and 6-20, many of which are shown in Example 2.5; such sets are extensively discussed by Headlam in terms of the influence exerted by their ic-4 content, as dyads (Headlam singles out Gb-Bb- see Part B.2 above) and as pure 6-20s or related 6-16s (again, see Part 2.B above).⁵³ Of note here are

- the use of hexatonic harmonies as the 'antecedent' chords in the final three progressions of the song, in bars 22-24, the first of these using Coll C, but in an arrangement that emphasises superimposed triads of E minor and Ab major, the second using Coll D, with triads of A minor and Db major, and the third using an incomplete grouping from

⁵⁰Headlam observes that these two chords also alternate in the first song, in bars 6-10 (op. cit., page 170 and page 419, note 102).

⁵¹Headlam (op. cit., page 173) observes a further pc set 5-32, in the upper five-note segment of the chord on the third beat of bar 15; the full six-note chord, pc set 6-27, is Coll 3 octatonic.

⁵²The diminished triad A-C-D# in bar 3 has also been included in Example 2.4 in a Coll 3 sequence, embracing bars 1-4; this is possible because the three notes are members of the diminished seventh tetrachord shared by Colls 2 and 3.

⁵³Op. cit., pages 172-3.

Coll A (pc set 5-21), with triads of D minor (implied) and F# major; each progression proceeds from its *hexatonic* chord to an invariant Coll 2 *octatonic* chord (pc set 5-32, each instance being a repetition, with octave displacements, of the final, B-based chord of the bars 20-22 sequence)⁵⁴ (Example 2.5a)

- oscillating hexatonic harmonies in bars 9-10, the first chord using a Coll B group Gb-G-Bb-B-D (pc set 5-21),⁵⁵ and the other using a Coll D tetrachord E-F-A-C (pc set 4-20), the latter extending to a Coll D pc set 5-21 when the voice's parallel F-Ab-E segment is incorporated (Example 2.5b)
- other instances of pc set 4-20, in the three hexatonic chords of bars 22-24 (Example 2.5a), in a vocal Coll C pc set 5-21 segment, E-C-B-G-Eb from bars 5-6,⁵⁶ and in the F-C#-Ab-C Coll D segment of the opening chord of the song (which is not, however, purely hexatonic, having a 'foreign' note, G) (Example 2.5c)
- instances of the only other exclusively-hexatonic tetrachords, 4-7 and 4-19 (Examples 2.5a, 2.5c and 2.5d⁵⁷)
- numerous instances of the only other tetrachord associated with the hexatonic scale, pc set 4-17, which is *also* found in the octatonic scale: particularly prominent as mediating 4-17s between the two domains (i.e. octatonic Coll 1 and hexatonic Coll A) are the frequent E-G-G#-B groupings, in bars 10 and 12-13 (Examples 2.5a and 2.5d)

Part D. The formal structure of *Warm die Lüfte*

The song falls into three broad sections. The outer of these share many features, most of which were highlighted earlier in the chapter. The relevant features are set out in Table 2.1.⁵⁸ A palindromic repetition of features is much in evidence: these are most exactly

⁵⁴Headlam's observation (ibid.) of an ic 4 (5-21-based collections) and ic 6 (tritones and the tetrachords 4-28, 4-25 and 4-9) opposition reflects the song's hexatonic/octatonic dichotomies; a similar contrast between ics 4 and 6 is a structural feature of Opus 5, No. 1- see Chapter 5, Part C.3.

⁵⁵This 5-21 is Headlam's 'catalyst' for the prominence of ic 4-based chords (Example 2.5a) at the end of the song (ibid.).

⁵⁶For Headlam, part of a further instance of pc set 6-16, F-E-C-B-G-Eb (ibid.).

⁵⁷The bar 6 pc set 6-20, from overlapping 4-19s has a pc set 5-21, F#-G-Bb-B-D, invariant with the bar 9 chord (Headlam, ibid.).

⁵⁸The information recorded in Table 2.1 is inevitably somewhat selective in the features it records; Robert P. Morgan makes the same point regarding his retrograde structure analysis of the first song, in his 'Retrograde and Circular Form in Berg', *Historical and Analytical Perspectives*, op. cit., pp. 111-150 (page 135).

balanced between the Introduction and Coda sections (bars 1-2 and 20-25) and within the middle part of the song (bars 9-14) with the barline between bars 11 and 12 as a central point. The table also shows that the central point is linked to the opening and to the Coda through the presence of groupings in the piano part that are associated through inclusion and complementation: a pc set 8-Z15 containing 5-20 and 4-Z29 in bars 1-2, a 7-20 containing 4-Z15 and 4-Z29 in bars 11-12, and a series of 7-20s each containing 4-Z29 and 4-Z15 in bars 20-22; these groupings are set out in Example 2.6. There is a more general (unordered) reiteration of features from bars 3-8, which are mostly reunited in bar 15 (although the bars 4-6 progression of rising sevenths-octave Fs-6-16 group *is* reversed as 6-16 group-octave Fs-rising ninths in bars 15-16).

In the formal scheme shown in Table 2.1, the first part, up to bar 8, corresponds to the text's scene-setting, as far as *'Ich will singen:'*, the middle section covers the poet/protagonist's 'song' up to the start of bar 15, while the third section (covering the rest of the song from the latter part of bar 15) firstly relates the girl's utterance (i.e. the girl in the 'song' introduced in bar 9)- *'Er kommt noch nicht. Er lässt mich warten...'* - and then presents the poet/protagonist's denouement.⁵⁹

Other events in the song are more progressive in function. The chord sequence of bars 20-22, for instance, stands apart from the rest of the song in its presentation of interval cycles in contrary motion: rising fourths in the bass, and descending semitones in the upper three parts; the chords alternate regularly between 'dominant thirteenth' and 'dominant sevenths with major *and* minor third', each being a 'resolution' of its predecessor, producing the cadential patterns V13>I7(=V7)>I13(=V13)>I7, etc.⁶⁰ But this progression has a richness of significance extending beyond the quasi-tonal. It was earlier described as a cyclic octatonic sequence, and an alternative whole-tone interpretation arises if a comparison is

⁵⁹Headlam's formal divisions differ markedly from those presented here, apart from his 'epilogue' which corresponds to Table 2.1's Coda b), and reflect the formal divisions of the poem as he sees them; op. cit., page 167.

⁶⁰These chords have been described as being '*appoggiatura* thirteenth' (M. DeVoto, 'Berg the Composer of Songs', op. cit., page 46, and 'Alban Berg and Creeping Chromaticism', op. cit., page 69); they possibly correspond in effect to the rising parts in minor sevenths in bars 4-5, which DeVoto likens to dominant sevenths: 'Berg the Composer of Songs', op. cit., page 44.

made with the related (alternating whole-tone) progression from the second song, bars 1-3 and 15-16: the same notes are used, except that here in the fourth song an upper 'voice' has been substituted which does not conform to the prevailing whole-tone harmonies (see Example 2.7); the whole-tone character of the progression is confirmed, however, in the parallel voice notes, which conform to the basic alternating whole-tone progression beneath.⁶¹

More particularly, there is a similarity between the piano's right-hand transformational patterns of bars 12-15⁶² and those of the final chord progressions of bars 22-25: in both cases one element remains invariant and therefore static (i.e. the reiterated C-F# of bars 12-15, and the B-based chord of bars 22-25) while the remaining elements are transposed at each phrase-repetition (i.e. all notes except C-F# become a semitone higher (at T-1) at each recurrence of the bars 12-15 phrase, and each first chord becomes a perfect fifth lower (at T-5) in the two-chord phrases of bars 22-24). The bars 22-24 progressive pattern has a further role, reinforcing the resolution of the previous progression of bars 20-22 (onto B) through the process of falling fifths in (specifically) the upper, second-inversion triad of each first chord, i.e. Ab major>Db major>F# major>(B major/minor), the last link being not a triad, but the B-based chord itself.

Overall, the song displays a basic succession of influential pitches, from the tonicising bass C (with its attendant fifth, G) in bars 1-11, via a series of further sum 7 PI dyads in bars 12-15, to the Sum 7 focal pair A-Bb in bars 15-19, and thence from the bar 19 low Bb, via the

⁶¹Both progressions, and a similar one in the first song (bars 7-10 and 25-26) refer to the depiction of death, as does a contemporary progression in Ravel's '*Le gibel*' from *Gaspard de la nuit* (1909): see M. DeVoto, 'Alban Berg and Creeping Chromaticism', op. cit., and D. Headlam, op. cit., pages 167-168 and 419, note 100; DeVoto cites a similar instance in Debussy's '*Six Epigraphes antiques*' of 1914. Such progressions have as their origin semitonally-moving tonal progressions which follow a pattern of rapid modulation, using chord-types such as augmented sixths and incorporating dominant and Neapolitan chord relationships; see Peter Schubert, ' "A New Epoch of Polyphonic Style": Schoenberg on Chords and Lines', *Music Analysis*, Vol. 12, No. 3 (1993), 289-319. The alternating whole-tone version of the progression (as found at the start of the second Opus 2 song) was a favourite device of Berg's, recurring in the second movement of the String Quartet, Opus 3, bars 13-15 (discussed in Chapter 3), in the first movement of the Chamber Concerto, bars 98-102 (quoted in D. Jarman, *The Music of Alban Berg*, op. cit., page 23), and in the Act 3 Interlude in *Lulu*, bars 705-709 (quoted in G. Perle, *The Operas of Alban Berg: Volume Two/ 'Lulu'*, op. cit., page 142). Progressions similar to those under discussion were also favoured by jazz musicians.

⁶²Described by Headlam in terms of successively unfolding patterns, op. cit., page 171.

rising fourths sequence (in the bass) in bars 20-21 *and* the falling-in-fifths second-inversion triads sequence (in the treble) of bars 22-24, to the tonicising B (with its attendant fifth, F#) in bars 22-25, i.e.

C(+G)>Sum 7 PI dyads>Bb/A>Bb>cycle of fourths/fifths>B

Chapter 3

The String Quartet, Opus 3, its thematic integration, and its whole-tone basis

Many of the harmonic structures in this Quartet result from two specific but interrelated areas of compositional procedure. The first involves Berg's developmental and hierarchical use of linear, voice-led motives, allowing the delineation of thematic groups and for certain interval associations and pitch classes to be emphasised, and bringing a degree of reflexive referential coherence (both developmental and recapitulatory) to each movement. The second area concerns the employment of various normative forms of note arrangement: the division of the octave into symmetrical groupings or interval cycles, and the use of identifiable aggregates (or significant parts of aggregates), such as the whole-tone and chromatic scales; although such symmetries and systems do not always occur consistently, they nevertheless have a vital part to play in the formation of each movement's harmonies and structural shape.

Part A. Reflexive reference and form

1. The first movement's motivic associations and their development from a *Grundgestalt*

The first movement's principal sonata-related themes/motives have been defined by Bruce Archibald,¹ and are listed here in Example 3.1 under the same names and at their initial pitch levels: *a1*, *a2* and *a3* form the main constituents of the first-subject group, and *b1*, *b2*, *b3* and *b4* those of the second-subject group.

¹B. Archibald, 'Berg's Development as an Instrumental Composer', op. cit., pages 97-104.

The Exposition, up to bar 80,² has a coherent sonata structure that divides neatly into two, with a first subject group section to bar 40 followed by a contrasting second subject group. The opening phrase, *a1* (second violin, bars 1-6), opens with a distinctive 'head' motive, largely formed from a descending whole-tone scale (bars 1-2), which is imitated at a lower pitch (a T-3 transposition) in the viola (bar 5) and recurs frequently thereafter as a kind of signal motive, often at its original pc level but at all other transpositional levels as well; this opening phrase (*a1*) is answered by a consequent, *a2*, in the first violin (bars 7-9), also whole-tone in construction. A far more extensive section follows (bars 10-31), built largely from the semitone-plus-minor third shape of the *a3* cell first stated in violin 1 in bars 10-11, and subsequently incorporated in the general polyphonic texture, using the full gamut of P, I, R and RI forms (and often retaining the original bars 10-11 rhythmic shape as well); a catalogue of these *a3* statements during this section (Example 3.2) shows there to be 48 occurrences altogether. Intermingled with *a3* are numerous examples of *a1*, and between bars 14 and 24 there are several imitative statements of a more extensive motivic phrase, a development of *a3* (first heard in bars 14-16 in the viola- see Example 3.3); by bars 21-23 the three descending semitones of this extended *a3* appear as an independent motive (the cello's Ab-G-F#, Bb-A-Ab, Eb-D-C# and F#-F-E), anticipating the use of this cell (in rising form) in the second subject (the *b2* 'counter' motive). The *a3* section reaches a climax at bar 32, and the first subject closes through a return to the *a1/a2* material of the opening (bars 32-40).

The developmental use of cells and motives noted in the *a3* section of bars 10-31 is one which continues throughout the movement, and can indeed be shown to be a continuing process right from the start. It has often been remarked that Berg's Opus 3 represents his final apprentice work under the tutelage of Schoenberg (although it is arguably his first mature work as well) and as such it utilises (as did the Piano Sonata, Opus 1) his teacher's predilection for continuous development.

It is Janet Schmalfeldt's contention, moreover, that

²The score designates the opening upbeat group of demi-semiquavers as an incomplete 'bar 1'.

- Schoenberg's concepts of *Grundgestalt* and developing variation should be considered together as associated parts of the same process
- Schoenberg incorporated both into his teaching of composition even at an early stage (as being a part of the German-Viennese tradition as he saw it)
- Berg followed this procedure in his Opus 1 Piano Sonata of 1908³

Working under these assumptions, the same description '*Grundgestalt*' should be given to the opening violin phrase of bars 1-6 (i.e. *a1*- see Example 3.1), consisting of both the descending '*head*' motive and the ensuing wedge figure which widens from the '*head*' motive's final B (bars 2-3) through to the D-A of bars 5-6;⁴ it should also include, perhaps, the descending semitones/fourths figure in viola and cello which occurs against the violin's held B in bars 2-3, since this is an associated part of *a1* at its subsequent most strategic appearances at its original pitch level, i.e. at bars 105-107 (the start of the Recapitulation) and bars 183-187 (the final five bars). As Schmalfeldt has found in Opus 1,⁵ the process of developing variation has already started within the *Grundgestalt* itself (Example 3.4): the F-C fourth which bounds the demi-semiquaver part of the '*head*' motive is immediately taken one fourths-cycle step further in the cello's F-C-G, while the viola's Ab-G-F# reflects at T-7 the '*head*' motive's semitonal descent Db-(A)-C-B, both also mirrored by the inverted and emphasised C-C#-D notes of the violin wedge;⁶ furthermore, the second violin's wedge is initiated through a repetition of the '*head*' motive's last two notes, C-B.

The derivation of *a2* (bars 7-9) can be seen in the untransposed repetition of the whole-tone group Eb-C#-B-A from the '*head*' motive (Example 3.5a). The *a3* cell, first stated thematically in bars 10-11 as E-F-Ab, is already present in the *Grundgestalt* in three separate guises, in retrograde form as Eb-C-B (notes 2, 5 and 6 of the '*head*' motive) and

³J. Schmalfeldt, 'Berg's Path to Atonality: The Piano Sonata, Op. 1', op. cit., pages 57-85.

⁴Schmalfeldt insists that the whole opening phrase, rather than the more concise initial motive (which in Opus 3's case is the *a1* '*head*' motive of bars 1-2), constitutes the *Grundgestalt*, *ibid.* page 84.

⁵*Ibid.* page 97.

⁶Perle notes the symmetrical division of the octave Fs into two tritones by the B, and a subdivision of these tritones into whole-tones in the violin's '*head*' motive and into minor thirds in the violin-violoncello chord of bar 2: George Perle, *Twelve Tone Tonality* (Berkeley: University of California Press, 1977), Ch. 20 and pp. 164ff.; this aspect of the *Grundgestalt* will be discussed in more detail later.

B-Ab-G (the '*head*' motive's final note plus the viola's first two notes), and in inverted form as C-B-Ab (the '*head*' motive's concluding two notes plus the viola's first note)- see Example 3.5b.⁷ Meanwhile, the *a3* 'extended motive', first heard in bars 14-16, i.e. the viola's G-Gb-Eb-(Gb)-D-(Gb)-C#, is a T-7 transposition of the *Grundgestalt*'s C-B-Ab-G-F# in violin and viola, bars 1-3, while its tail of Eb-Gb-D-Gb-C# is *also* a T-4 transposition of the *Grundgestalt*'s B-D-Bb-D-A of bars 4-6 (Example 3.5c). Furthermore, there is a rhythmic and expressive similarity, especially between bars 4-5 of the *Grundgestalt* and bars 15-16 of the *a3* extended motive.

The second subject group contrasts with the first not just through having a distinctive tempo, but equally through the virtual absence of any overt reference to earlier motives (just two statements of *a3* in bars 52-53, in violin 1, and two in an extended variant in bars 71-73, in the cello- Example 3.5d). However, the motivic material here *does* bear relationship to the first subject group in various less-obvious ways. *b1*'s first three pitches, C#-D-B (bars 43-44), are a retrograde at T-2 of the final three notes of the '*head*' motive; at the same time the first three notes of *b1* (C#-D-D) borrow the rhythm of the *a3* cell of bars 10-11, i.e. quaver rest-crotchet-quaver-(other note) (Example 3.5e). The opening three notes of the *b3* 'anticipation' of bars 45-46 (Eb-Bb-A) might be viewed as being a T-10 transposition of notes 1, 5 and 6 of the '*head*' motive (Example 3.5f). Subsequently, *b2* (bars 48-49), *b3* (bars 51-54) and *b4* (bars 58-60)⁸ *all* incorporate the '*head*' motive's sequence (its notes 1, 2, 3 and 6) of four descending whole-tones (Example 3.5g).

Additional second subject relationships are that

- *b2*'s 'counter' motive, as already mentioned, is anticipated in the '*head*' motive and in the *a3* 'extended' theme
- *b3*, in bar 52, happens also to be an interval expansion of the *b2* of bars 50-51 (i.e. contourally)

⁷Headlam makes the point that the lower instruments' parallel C-Db-Eb and B-Bb-A in bars 10-11 are also deriveable as cells from the '*head*' motive (op. cit., page 84).

⁸*b4* appears simultaneously in retrograde form, in violin 1.

- the start of both *b3* and *b4* derive from part of the wedge expansions in bar 4, i.e. bar 4's C-B-C# (violin 2), E#-F#-E (viola) and Ab-G-A (cello) relate in shape to *b3*'s Bb-A-B in bars 51-52 (cello, with an octave displacement) and *b4*'s E-Eb-F and Db-D-C in bars 58-59 (viola, the second being with the same octave displacement, an inversion of that in *b3*)

The delineation of 'themes' in this second subject group once again becomes diffused through developmental processes of combination, i.e.

- a variant of *b2* with *b3* in bars 51-54
- *b1* with *b2* in bars 63-72

and fragmentation, i.e.

- a short initial statement of *b1* in bars 43-44 is followed by an anticipatory variant of *b3* in bars 45-47
- in bars 58-60, an initially curtailed concluding theme, *b4*, is only resumed in bars 77-80 (in the cello) but is also simultaneously dismembered, note-by-note (in violin 1), through a series of upward transpositions

The Development section, when it comes, is short (24 bars) and not really a 'development' as such, since this process has already been a continuous feature of the Exposition: it is more a series of sequential workings of two ideas, *b4* and *b3*, culminating in a protracted passage of violent climaxes (bars 90-102).

The Recapitulation, from bar 105, resumes the processes of development and diversity of presentation, to the extent that its episodic nature denies the 'properly'-ordered (i.e. as would traditionally be expected in a sonata-form movement) re-presentation of themes.

After an initial concise but distorted restatement of *a1*, fragments of *a1*, *b1*, *b3* and *a2* are dressed in new martial guise, with dotted and triplet rhythms to the fore, derived from the *Grundgestalt*'s viola/cello figure of bars 2-4 (bars 108-119; bars 108-111 are related to bars 41-46, the start of the second subject group). The beginnings of an *a3* (plus *a1*) reprise (bars 119-125: c.f. bars 10-13) are interrupted by a new transition based on a passage from

an early piano sonata (bars 126-131),⁹ before leading into a variant of the *a3* 'extended' motive sequence (bars 132-137, heard before in bar 14 *et seq.*). A developmental reprise of *b3* then follows (bars 138-152), finishing (in bars 149-152) with allusions to *b2*.

Most writers have seen bar 153 as signalling the start of an extended coda.¹⁰ But this could equally represent the start of a second Recapitulation, since much of the reprise of material is yet to come. Once again, initial martial rhythms underpin motivic elements (*a1*, *a2*, and the 'counter' motive in retrograde, bars 153-157), this time leading to a partial reprise of the 'concluding theme' section, using *b4* and *b2*, in bars 158-169 (c.f. bars 58-64),¹¹ then to overlapping and parallel *stretti* using *a1*'s 'head' motive (some in augmentation) in bars 169-176 (plus a single statement of the *a3* cell in bar 172, violin 2),¹² and finally to a *b4* resumption in bars 177-179 (c.f. bars 77-80). Bars 180-182 repeat the *a1/a3* material from bars 172-176, and a short concluding Coda¹³ amplifies the opening's *a1 Grundgestalt* sequence (bars 183-187).

2. The second movement's themes and motives defined

The principal descriptive analyses of the second movement have been provided by Adorno¹⁴ and Carner.¹⁵ While both assign a sonata-rondo structure, Adorno gives rather more weight to the sonata-form sections of Exposition, Development (bars 72-150) and Recapitulation, while Carner focuses on the four Episodes, which he locates at bars 34, 50, 72 (the start of the Development) and 119.¹⁶

⁹For accounts of this exegesis, see M. DeVoto, 'Alban Berg and Creeping Chromaticism', op. cit., pages 72-73, and Ulrich Krämer, 'Quotation and Self-Borrowing in the Music of Alban Berg', *Journal of Musicological Research*, Vol. 12, Nos. 1-2 (1992), 53-82.

¹⁰e.g. in T. W. Adorno, op. cit., page 59, M. Carner, op. cit., page 105, and J. Samson, op. cit., page 163.

¹¹But incorporating, once again, the 'counter' motive of *b2*, in retrograde (bars 166-168, violin 2).

¹²Bars 173-174 are perhaps a 'true' recapitulation of bars 1-5, since it is only here that the original F to B 'head' motive is answered by the T-3 Ab to D version.

¹³Archibald has the Coda starting with the *b4* entry at bar 177: op. cit., page 103, Fig. 1.

¹⁴Op. cit., pages 59-62.

¹⁵Op. cit., pages 105-107.

¹⁶Headlam (op. cit., page 145) gives 'a broad three-part ABA design' where exposition and recapitulation are each rondos with subsections.

The movement's themes/motives are listed, in order of their first appearance, in Example 3.6, and can be named thus:

- the *ritornello*, called 'principal theme' by Adorno, which appears at bars 1-4 (violin 1), 47-49 (in the same *tessitura*, but truncated), 60-62 (three octaves lower, in the cello, and similarly truncated), 151-152 (at the original high *tessitura*, but further truncated) and 222-226 (stated in full, but an octave and a fourth lower, i.e. at T-7,¹⁷ and in the cello)
- a repeated single note *stentato* figure, usually associated with the open strings, initially on D (bars 4-8, 23 and 65-71) but later on G/D/A/E/B/F# (bars 72-87, the start of the Development) and A/D/G/C (bars 148-151, the conclusion of the Development), before returning to D (bars 165-169 and 230-231)
- a primarily whole-tone *marcato* theme, called 'contrasting idea' by Adorno and 'second theme of the first subject group' by Jarman,¹⁸ which first appears in the bass of bars 5-7 against the *stentato* Ds, and recurs in bars 23-24 (violin 2 at T-0), 181-182 (but *pizzicato*, in violin 1, at T-2), 209-210 (*piano/marcato* in cello, at T-5) and 214-217 (the theme's first six notes, *marcato*, in violin 1, at T-7)
- an *anticipatory variant* of the *marcato* theme, an octave and a fifth higher (i.e. at T-7 of the *marcato* theme's opening, but with the prominent descending tritone at T-0), in *tremolo* violin 2, bars 2-3; this variant becomes a motive in its own right, through its recurrence at the same pitch in bars 43-45 (violin 1) and then at bars 46-47 (violin 2, at T-3), 185-186 (viola, at T-7), 195-196 (cello, at T-11, but with notes 3, 4 and 5 at T-1¹⁹) and 198-200 (in parallel augmented triads, at T-5/9/1, and in violin 2, at T-5)
- a *lyrical theme*, a contoural variant of the *ritornello*, which appears in the viola at bars 9-13, is repeated almost immediately by the same instrument at T-6 and in modified form by the second violin at T-10 in bars 16-20, and reappears developmentally in the *Presto* section of bars 88-110 (all four instruments in unison at T-0 in bars 88-91, and with *stretto* entries in bars 103-110- see Example 3.7)

¹⁷An alteration to the wedge formation occurs in the cello *ritornello* from the G# at the end of bar 224, with the result that the transpositional level starting from the low A of bar 225 is now T-5.

¹⁸*The Music of Alban Berg*, op. cit., page 34.

¹⁹This unexpected divergence is present in the manuscript score of the Quartet (Österreichischen Nationalbibliothek (ÖNB) Musiksammlung F 21 Berg 8), and is not, therefore, a mistake.

- a diatonic scale figure, using a tied/dotted rhythm, in violin 2, bars 13-15, whose 'tail' of rising major third-plus-fifth is subsequently developed (bars 16-22), but which emerges (without 'tail') as a thematically-developed idea in bars 119-141
- a sextuplet motive, a contoural variant of the *marcato* theme, which appears twice in bars 25-27 (violin 1); at its reappearance in bars 42-45 an association is established with the 'anticipatory variant' (both are variants of the *marcato* theme), and the same association is re-established in the Recapitulation (at bars 185-188); the sextuplet motive is also stated once in the Development, in bars 116-117
- a sequence of two chords, called 'signature harmonies' by Adorno, the first of which is usually played *tremolando* and both of which are usually played *am Steg* and prefaced by the *marcato* theme's vehement descending tritone figure (in the bass); they are first heard in bar 34, extended wedge-like into a more extensive sequence of chords in bars 35-40, and appear thereafter at the same transpositional level (in bars 91-92, 77-178 and 217-226)
- a grazioso variant of the *marcato* theme, first heard in bars 39-40 (viola and cello), which dominates the earlier and later parts of the Development (in bars 78-87 and, inverted, in bars 145-150), and returns as part of the contrapuntal texture of bars 194-203
- a falling fourth-plus-semitones figure, first heard in bars 37-38 (viola and cello, played *pizzicato* and *col legno/mit Dämpfer* respectively) in association with the 'grazioso variant', and later played with a variety of similarly-specialised techniques: *am Griffbrett* (bars 111-115, in various transpositions) and *am Steg* and *flautando* (bars 190-193, again as a prelude to 'grazioso variant' entries, and at the same transpositional level as in bars 37-38)
- a broad 'Second theme' group, initially stated in bars 54-60, and recapitulated in varied form, but at the same basic transpositional level, in bars 200-208

Carner's Episode 1 starts with the signature harmonies at bar 34, and proceeds with a succession of motivic gestures in bars 37-47 which encompass the fourth-plus-semitones

figure, the *grazioso* variant, the sextuplet motive and the anticipatory variant.²⁰ Episode 2, starting in bar 50, incorporates the second subject group of bar 54. Carner divides the Development into Episodes 3 and 4, the former being concerned with a development of the *stentato* figure and the *grazioso* variant, the latter with the diatonic scale figure; these are separated by the central *Presto fortissimo* incarnations of the lyrical theme (bars 88 and 103), which therefore acts as a surrogate '*ritornello*' between the episodes;²¹ the Development concludes as it began, with reference to the *stentato* figure and *grazioso* variant (bars 145-150).

The extended passage (an Episode 5, perhaps?) between the *ritornelli* of bars 151-152 and bars 222-226 forms what Adorno calls a 'prose' reprise (of the Exposition material).²²

Carner points out that during this passage an affinity with the first movement 'becomes overt',²³ with renewed appearances of

- the first movement's *b*2 'counter' motive, G#(Ab)-A-Bb in demi-semiquavers, in bars 154-156 (violin 1/viola/violin 2) and bar 180 (violin 2's triplet semiquavers figure at the end of the bar, subsequently transposed up a tone at the end of bars 182 and 184)
- the '*head*' motive and elements of *a*1, in bars 168-170 and bars 227-230 (Example 3.8)
- the march rhythms (of Movement 1's bar 108 *et seq.* and bar 153 *et seq.*), in bars 171-184

3. Thematic and motivic association in the second movement, through intervallic cells and transpositional invariance

It might be argued that most of the second movement's first subject group themes and motives have a contour resemblance to each other (see Example 3.9): a falling sequence of notes followed by a rising sequence can be seen in the *ritornello*, the *marcato* theme and

²⁰Adorno, op. cit., calls this passage a 'transition'.

²¹Adorno, ibid., ascribes a 'renewed rondo entrance' to this bar 88 *Presto*, page 61; the lyrical theme's relationship to the *ritornello* has been signalled earlier, since the syncopated repetitions of its first note, F#, in bars 8-9 anticipate the similar anacrusis to the first rondo reprise of the *ritornello*, in bar 47, and indeed to all the subsequent occurrences of both themes.

²²Ibid., pages 61-62.

²³Op.cit., page 107.

its anticipatory variant, the lyrical theme and the sextuplet motive. Further, each of these themes/motives excepting the lyrical theme has a third, falling sequence of notes, while the *grazioso* variant of the *marcato* theme traces the second and third (up, then down) sequences of its progenitor.

Some thematic/motivic associations are more exact, through the recurrence of four intervallic cells:

- a three-note cell from the semitonal scale (ics 1,1) which occurs twice in the *ritornello*'s opening phrase (i.e. the falling Ab-G-F# and the rising C#-D-Eb), and then appears in the anticipatory variant (a rising A-Bb-B, in the second violin, bars 2-3) and the fourth-plus-semitones figure (a falling F#-F-E, in viola and cello, bars 37-38); the semitonal movement at the tail of the *ritornello* (F#-F-E-Eb-D falling, bars 2-4), of the anticipatory variant (in its wedge formation, i.e. F#-G-Ab rising and C#-C-B falling, bar 3) and of the lyrical theme (Bb-A-Ab falling, bars 12-13) can be seen as extensions of this cell, as can the falling semitonal aspect of the second subject theme (F-E-Eb-D, bar 54)- see Example 3.10a
- the major seventh (ic 11) figures in the *ritornello* (a falling Eb-E, which occurs twice, firstly at the end of bar 1, and then again an octave lower in bar 3 as the goal of the widening wedge starting on the B of bar 2- see Example 5b), in the *marcato* theme (again, a falling Eb-E, a part of the widening wedge starting C#-F# in bar 6), in the sextuplet motive (a rising A-G#, bar 25), and in the second subject theme (a rising F#-F, bars 53-54); an elaboration of this interval, with an infilling of a major third and fifth gives a cell (ics 4,7) which forms the tail of the diatonic scale (a rising F-A-E, bar 15) and also occurs as the latter part of the *grazioso* variant (a falling D-Bb-Eb-B, bars 39-40)- Example 3.10b
- the major third (ic 4) figures in the *ritornello* (both F-Db and F-A, bar 2) and at the start of the *marcato* theme and its anticipatory and *grazioso* variants (C-Ab, bar 5, G-Eb, bar 2, and C-E, bar 39, respectively);²⁴ an elaboration of this interval, with an infilling of two whole tones gives a cell (ics 2,2) which appears in the *marcato* theme

²⁴This interval also figures as part of the (ics 4,7) cell.

(a rising D-E-F#, bar 5), in the diatonic scale (rising G-A-B²⁵ and C-D-E, bars 13-14), in the lyrical theme (a falling F#-E-D, bar 10), in the sextuplet motive (G#-F#-E,²⁶ bars 25-26) and, reordered, in the *grazioso* variant (C-E-D, bar 39)- Example 3.10c

- a falling tritone (ic 6) figures as the interval between the second and third notes of both the *marcato* theme and its anticipatory variant (Ab-D, bar 5, and Eb-A, bar 2, respectively), between the sixth and seventh notes of both the *marcato* theme and the lyrical theme (G-C#, bar 6, and Bb-E, bar 12, respectively) and between the seventh and eighth notes of the anticipatory variant (again, G-C#, bar 3); the *marcato* theme's G-C# becomes the bass accompaniment to the signature harmonies in bars 34-36,²⁷ and again in bars 177-178 and 217-218- Example 3.10d

Some associations between variants and their progenitors are also intervallically specific, or invariant:

- the first three notes of the anticipatory variant (G-Eb-A, bar 2) are a T-7 transposition of the first three notes of the *marcato* theme (C-Ab-D, bar 5), while the same variant's notes 6, 7 and 8 (F#-G-C#, bar 3) match notes 5, 6 and 7 of the *marcato* theme (at T-0, bars 5-6)- Example 3.11a
- the first three notes of the lyrical theme (F#-E-D, bar 10) match notes 3, 4 and 5 of the *marcato* theme in retrograde order (at T-0, bar 5), while the same theme's notes 4, 5, 6 and 7 (F-G-Bb-E, bars 11-12) follow the shape of notes 3, 4, 6 and 7 (D-E-G-C#, bars 5-6) of the *marcato* theme (at T-3), and its notes 7, 8 and 9 (E-F#-A, bar 12) also match notes 3, 4 and 6 (D-E-G, bars 5-6) of the *marcato* theme (at T-2)- Example 3.11b
- notes 1, 2, 3 and 4 (G-A-B-C) and 4, 5, 6 and 7 (C-D-E-F) of the diatonic scale figure (bars 13-15) follow the rising tone-tone-semitone pattern of notes 3, 4, 5 and 6 (D-E-F#-G, bars 5-6) of the *marcato* theme (at T-5 and T-10); the same intervallic pattern occurs in retrograde between notes 5, 6, 7 and 8 (A-G#-F#-E, bars 25-26) of the sextuplet motive²⁸- Example 3.11c

²⁵One of these major seconds appears in compound form, as a major ninth.

²⁶Again, with a major ninth for one of the major seconds.

²⁷In the viola: the cello's falling tritone was originally intended to be an octave lower, but was then altered to A-D#, a seventh below the viola - see footnote 64 in this chapter.

²⁸With the central two notes displaced an octave.

- notes 3, 4 and 5 (G-F#-A, bar 25) of the sextuplet motive match notes 2, 3 and 4 of the *ritornello* (at T-0, bar 1)- Example 3.11d

Some important thematic/motivic elements relate directly back to elements within the themes of the first movement. Jarman has identified several such relationships:²⁹

- the (ics 1,1) cell Ab-G-F#, the first three notes of the *ritornello* (and of the movement) appeared originally as part of the first movement's *al Grundgestalt* (movement 1, bars 2-3, viola); it has already been noted that these pcs then appear in retrograde order in the anticipatory variant (bar 3, Example 3.8a), but they also figure reordered in the *marcato* theme that follows (its notes 2, 5 and 6, in bars 5-6) and in the wedge formation that accompanies the first part of the *ritornello* in bars 1-2 (violin 2, G#-G-F#)- Example 3.12a
- the first movement's *a3* cell is used (in overlapping, pc set 4-7 form) as the next four notes (A-Bb-C#-D, bar 1) of the *ritornello*- Example 3.12b
- the *ritornello*'s widening wedge formation of bars 2-3 resembles that of the first movement *al Grundgestalt*, particularly in its succession of dotted rhythms; this rhythmic figure also informs the *marcato* theme (notes 6, 7 and 8, bar 6), the diatonic scale figure (bars 13-15), and the tail of the sextuplet motive (its notes 6, 7 and 8, bars 25-26)- Example 3.12c
- the *marcato* theme's first five notes (the whole-tone collection C-Ab-D-E-F#, bar 5) are an inversion of the first five notes of the first movement's *a2* (Eb-G-C#-B-A), and display a similar rhythm; meanwhile, the next three notes (6, 7 and 8: G-C#-F#, bar 6) of the *marcato* theme replicate the pitches and downward fall of *a2*'s notes 2 and 3 (G-C#) and 6 and 7 (C#-F#); the anticipatory variant's first three notes (G-Eb-A, bar 2) also replicate the pitches of *a2*'s notes 1, 2 and 5- Example 3.12d
- the sextuplet motive's falling fourths F-C-G (bar 25) appeared originally as part of the *al Grundgestalt* (first movement, bars 2-3, cello); but falling fourths are already evident in this movement in the *melée* of bars 1-3, i.e. in the anticipatory variant (notes

²⁹The Music of Alban Berg, op. cit., pages 33-34.

5, 6 and 8: B-F#-C#, bar 3), in the viola part of bars 1-2 (again, B-F#-C#³⁰) and in the *ritornello* itself (the first note of each of its second, third and fourth phrases: A, E and B, bars 1-2)³¹- Example 3.12e

- the sextuplet motive's first six notes (i.e. *five* sextuplet notes slurring onto a further note) replicate the rhythm of the '*head*' motive³²- Example 3.12f
- the signature harmonies in their extended form (bars 36-38) resemble the *a3* sequence of the first movement's bars 10-11- Example 3.12g (corresponding pcs are ringed)
- instances of four consecutive notes from the descending whole tone scale recall those of *b2*, and of the first movement's second subject in general: Jarman cites bars 133-134 (in a downward variant of the diatonic scale figure in the viola, i.e. F-Eb-Db-Cb), but the sequence has appeared earlier, in bars 16-18 (a descending sequence of the (ics 4,7) cell in the cello, the lowest notes of which map out the Bb-Ab-Gb-E pcs of *b2*), and in the second theme group/Episode 2 (e.g. F-Eb-C#-B in violin 1, and E-D-C-Bb in violin 2, in bars 56-57)- Example 3.12h

The close correspondence between the first movement's *a2* and the second movement's *marcato* theme (Example 3.12d) was consciously worked out by Berg. A sketch on page 68 of ÖNB Musiksammlung F Berg 7 has *a2* aligned against the *marcato* theme (labelled *Hauptth*), the latter in the T-7 transposition it acquires at bar 214, in order to show the derivation: Eb-G (notes 1 and 2 of *a2*) against G-Eb (notes 1 and 2 of the *marcato* theme), and then C#-B-A (notes 3, 4 and 5 of *a2*) against A-B-C# (notes 3, 4 and 5 of the *marcato* theme).

4. Invariant pitch groupings

The '*head*' motive itself represents a significant invariant in the *first movement*, since its initial transpositional level in bars 1-2, proceeding from an F to a B, returns to inform

³⁰The 6-note phrase embraced by these fourths presents a 'pre-anticipation' of the *marcato* theme in its contour shape.

³¹The fourth-plus-semitones figure has *a3* as its origin: compare Movement 1, bars 98-102 with Movement 2, bars 112- 116, both of which are Development section passages.

³²Headlam relates the two themes even more closely, *op. cit.*, page 145.

subsequent important structural points in the score: at bars 27-28 (as an introduction to the climax of the next four bars), at bars 105-106 (the start of the Recapitulation) and increasingly frequently thereafter (i.e. at bars 121, 124, 132, 134, 137, 156-157, 169, 172, 173 and 184-185).

In a way analogous to that expected in any tonal Sonata movement, certain other elements from the first subject prove to be transpositionally invariant:

- the viola/cello descending semitones/fourths figure of the *Grundgestalt* recurs, with the same pcs, at the start of both Recapitulation sections, at bars 105-107 and bar 153, and at the end of the movement, at bars 183-185
- *a*2 remains pc-invariant at *all* of its numerous appearances, usually as a coda to *a*1 sections (i.e. at bars 7-9, 38-40, 112-115 and 157)
- the initial three-part harmonisation of the *a*3 statement of bars 10-11 recurs using the same pitches, first in diminution in bar 28, and then at its recapitulation in bars 119-120 (although here with the upper parts redistributed, and the B-Bb reversed to Bb-B)

But some of the second subject material is also recapitulated at its same transpositional level:

- *b*1's D-B-F#-D# (then *b*2's Eb-Bb) of bars 43-48 (in violin 1) recurs near the start of the Recapitulation, in bars 110-111, as D-B-F#-D#-A# (violin 2), while the cello's attendant *b*3 anticipatory figure Eb-Bb-A-D-Ab-G-Gb-F-E also recurs in bars 111-112 (in violin 1)
- *b*2's Bb-Ab-Gb-Fb(E) descent, found in bars 48-51 and 73-76, appears again in bars 147-152
- four bars of *b*4, starting at bar 60 (cello and viola), return in similar guise at bars 159-165, while a small amount of the *b*4 resumption, at bars 78-79, is repeated untransposed in bars 178-179 (but only in violin 1 and cello)

Some of the *a*3 cells in bars 10-31, all of them in P-form, are recurrent at the same pc levels more frequently than others:

- the initial E-F-Ab of bars 10-11 recurs four times, in bars 18, 21, 26-7 and 28
- the F-F#-A of bar 12 recurs twice, in bars 20 and 30
- the C#-D-F of bar 13 recurs three times, in bars 16, 25 and 30
- the B-C-Eb of bar 13 recurs twice, in bars 24 and 28
- the G-Ab-B of bar 14 recurs seven times, in bars 17-19 (four times), 26, 27 and 29
- the D-Eb-F# of bar 19 recurs twice, in bars 22-23 and 31

More specifically,

- the B-C-Eb and G-Ab-B cells relate directly back to bars 1-3 of the *Grundgestalt*
- the E-F-Ab and G-Ab-B cells return to dominance in bars 26-29
- all of the above six cells except one return in the second violin to articulate five of the six lower string phrases of bars 28-31, and the sixth of the above cells, D-D#-F# appears in this instrument's sextuplet phrase in the second half of bar 31
- in the passage from bar 14 to bar 18, the five G-Ab-B cells create a local quasi-canonic effect³³- Example 3.13a

This last-mentioned kind of covert canonic repetition becomes a more obvious procedure later in the movement (bars 112-131), with three statements of the C#-B-A descent of *a*2 in bars 113-114 (violin 1-violin 2-cello)- Example 3.13b- and numerous *stretto*-like repetitions of *a*3 using Eb-E-G in bars 123-125 (violin 1-violin 2)- Example 3.13c, leading finally, in the 'early piano sonata' section, to three entries on F#(Gb)-F in bars 126-128 (violin 2-violin 1), followed by three Bb-A-Ab chromatic descents in bars 129-131 (violin 1-violin 2-cello)- Example 3.13d.

These latter descents are directly anticipated in the cello's '*head*' motive tail in bars 125-127, while the first of them (bar 129) is counterpointed by a retrograded *ascent*, using the same pcs, in violin 2. This G#-A-Bb orientation has been a prominent recurrent factor since its initial association, as a 'counter' motive, with *b*2 in bars 48-51 (Example 3.1), to the extent that at times it takes on the mantle of another 'signal' motive, almost as

³³Those in bars 17-18 are part of a longer series, G-Ab-B-C-C#-F, in violin 2, then violin 1.

distinctive as that of the '*head*' motive itself, becoming a particularly potent element in the *b2* sequences of bars 73-76 (near the end of the Exposition) and bars 148-152 (the end of the first Recapitulation); its derivation is in the chromatic element of the *Grundgestalt* itself, of course (Example 3.4).³⁴

Single pitches and collections sometimes take on temporary invariant significance as recurring pedal points in this first movement,³⁵ notably

- in the climactic part of the Development, the high Gs of bars 90-98, initially part of a *b3* figure, followed by the high Cs of bars 99-103, initially preceded by a *b3*-derived Eb-D-Db, both in first violin, which together contribute to the preparation for the Recapitulation (this preparation being complemented in bars 101-104 by a pedal figure using *a1*'s cello fourths F-C-G, and in bars 102-104 by reiterations of the viola Ab-G-F#)
- the Bb-C figure of bars 143-149, at the dynamic climax of the Recapitulation, initially in *altissimo* violin 1, then violin 2 (bar 147) and viola (bar 149), derived from the '*head*' of *b3*

Significant, too, is the recurrence of pc elements from the largely whole-tone cadential sonority of bar 9, G-A-D-Bb-C-E-F#, firstly at the first subject climax at the start of bar 32 (C-G-Bb-G-F#, prolonged as E-D-Bb-F# into bars 33-35)-Example 3.14a, and then at bar 59 (E-C-D-Bb-E-F#), the second of the four climactic chords of the second subject group-Example 3.14b. Two of these pitches, F#-E, can be singled out as having a special cadential significance

- in bar 9, as *a2*'s tail (violin 1)³⁶
- in bar 40, the same function, now at the end of the first subject group (cello)

³⁴Headlam notes the cell's presence during the *a3* passage of bars 10-20, its initial presentation being the B-Bb-A descent in the viola in bars 10-11 (op. cit., page 84).

³⁵Headlam cites pcs C and Eb as 'prominent throughout the movement' (op. cit., pages 85-86).

³⁶Headlam relates these two notes to the movement's initial F (op. cit., page 79).

- at bar 49, as the concluding two of the four descending whole-tones of *b2*, spelt Gb-Fb (violin 1), and reiterated as Gb-E in bar 51 (decorated as Gb-A-F-E), bar 74 (Gb-Fb, violin 1) and bar 76 (violin 2, as in bar 51)
- as a prolongation of the latter, in bars 78-80, at the conclusion of the Exposition (violin 2)
- in bars 115-116, again as *a2*'s tail, just prior to the reintroduction of the *a3* recapitulation (cello), i.e. corresponding to bar 9
- at bars 148-152, again as part of the descending whole tones associated with *b2*, and immediately preceding the 'Coda'/Second Recapitulation of bar 153 (spelt variously, some in 'decorated' form, in violin 2-violin 1-violin 1-violin 2-cello)

The most significant non-thematic invariant grouping in the second movement is the (basic intervallic cell) tritone-dyad C#-G, which typically appears *fortissimo* and *marcato* in the cello's extreme bass either as a simultaneity or as a semiquaver figure; there are six such instances (occurring with increasing frequency towards the end of the movement):

- in bar 24, echoing the same pcs as occurred in the *marcato* theme of bars 23-24 (but here spelt Db-G)
- in bars 34-36 (*fff*, in the viola), a consequence of the *marcato* theme pcs but now associated with the signature harmonies
- in bar 150, on the final two triplet semiquavers before the start of the reprise (spelt Db-G)
- at bars 170-172 (but *pp*, non-*marcato*), where the low C# underpins the final G-F# dyad of *a1*'s descending semitones/fourths figure- see Example 3.8; the dyad reappears soon after, in bars 175-178 (*piano*, *marcato*), now underpinning the signature harmonies
- in bars 190-191 (*pp*)
- in bars 217-218 and 226-232 (the movement's final bars), at dynamics varying between *p* and *fff*, underpinning elements from the *marcato* theme, signature harmonies, *a1* 'head' motive and the *stentato* figure

The same figure, transposed at T-1, occurs in bar 91, associated with the signature harmonies.

Most writers have designated D as being the principal pc centre for this second movement, and Samson has identified C# and Eb as being associated satellites which tend to pull inwards semitonally to this pivotal D.³⁷ His diagram illustrates the following instances:³⁸

- in bars 3-4, the (Sum 8) wedge-like movement in first violin and viola, via Eb and C#, to a unison D (setting off the *stentato* figure on repeated Ds)
- in bar 23, the octave Ds in violin 1; these are a 'resolution' from the immediately preceding D#(Eb)-F#-C# figure of bar 22
- in bars 34-36, a low Eb (spelt D#) in the cello³⁹ and C# in the viola
- in bars 50, 59 and 62, low C#s in the cello which ultimately 'resolve' upwards onto the viola's triplet figure Ds of bar 64
- in the Development section, where the satellite pcs are sounded together briefly in bar 112 (Eb in cello, C# in violin1) and in bars 142-143 (C# in cello and violin 2, Eb in violin1); this relationship is repeated more emphatically at the start of the Recapitulation, in bar 153 (C# in cello, Eb in violin 1), whereupon reiterated C#s in cello (bars 154-157), violin 1 (bars 157-164) and then all four instruments (bars 164-165) partially 'resolve' onto the *stentato* figure Ds of bars 165-169 (partially, because the C# remains in the bass as the cello's lower note, subsequently becoming associated with its tritone partner G from bar 170 onwards)
- in bars 221-223, where Ebs in the cello partially resolve onto the sustained viola D of bars 223-226 (partially, because a sustained Eb remains in violin 1); the dichotomy is reversed (C# in cello, D in violin 1) in the movement's final bars (230-232), finding resolution in the D minor triad of the final bar's third quaver beat⁴⁰

³⁷Op. cit., his Example 66, page 213.

³⁸It has already been noted that these three pitches figure together as one of the (ics 1,1) cells in the *ritornello*.

³⁹But see footnote 64 in this chapter.

⁴⁰Although this final resolution onto D is tempered by the ensuing chord cluster that finishes the work on the final semiquaver of the same bar.

One further invariance can be noted: a prominent rising minor sixth figure Db-A, deriving directly from this dyad's presence in the *ritornello*, which itself rises in octaves through all four instruments in bars 49-51 of this second movement (just after the second *ritornello*), becomes inverted to an equally-prominent rising (basic intervallic cell) major third A-C# figure, which falls in octaves in the first violin in bars 110-114 (at a structurally-similar point, just after the lyrical theme's 'surrogate *ritornello*' passage).⁴¹

Part B. Normative forms of organisation

As with the Opus 2 songs, systematic and generative elements such as interval cycles, and other forms of inversional symmetry such as wedge-like formations and symmetrical configurations of limited transposition, inform many aspects of the Opus 3 Quartet. These devices are particularly widely used in the *second movement*, providing links or filling intervallic space, accompanying thematic material, effecting transitions into new structural sections, and helping to establish tonal centres.

1. Interval cycles and wedge formations

George Perle has claimed that the opening nine bars of the Quartet are defined, generated and shaped by 'interval cycles alone'.⁴² As well as describing the whole-tone/tritone ('*head*' motive) and semitonal/fourths (aligned in viola/cello) elements to the *Grundgestalt*'s first three bars (Example 3.1), and the contrasting whole-tone areas of bars 5, 6-8 and 9 (Example 3.15), he cites the harmony of bar 2 as presenting a further tritone, so that the held B in violin divides the octave F-F into two:⁴³ the second, vertical tritone is further divided into two minor thirds (Example 3.16);⁴⁴ thus, interval-1, 2, 3, 5 and 6 cycles are represented at the outset. The interval-1 cycle is further represented by two wedge

⁴¹The presence of C# in each of these second movement invariant groupings, C#-G, C#-D-Eb and Db/C#-A, will be discussed later (in Part C.3), particularly in its relation to D and G.

⁴²'Berg's Master Array of the Interval Cycles', op. cit., page 4.

⁴³Ibid. page 6.

⁴⁴Headlam has much to say about registral spans during the first few bars, and a D/F/Ab/B interval-3 cycle dominance within each (op. cit., page 79).

formations, which Perle sees as inversionally related inflections,⁴⁵ firstly of the bars 2-3 held B in violin (the wedge occurring in the second violin at sum 11 in bars 3-6: Example 3.17)⁴⁶, and secondly of the final dyad, G-F#, of the bars 2-3 semitones/ fourths alignment in viola/cello (the wedge occurring in the same instruments at sum 1 in bar 4: Example 3.18).⁴⁷ Perle nevertheless concludes that 'an overall precompositionally definable system does not govern the quartet as a whole';⁴⁸ inversionally symmetrical wedge formations are indeed scarce during the rest of the first movement, and show no consistent or long-term associative patterns of axial sum symmetry (excepting, perhaps, Sum 10 with its focus on F and B during bars 1-15)- Example 3.19.

The principal interval cycles employed in the *first movement* are those of interval-2 (the whole-tone scale) and interval-1 (the chromatic scale). The interval-5 (fourths) and interval-6 (tritones) cycles take a more subsidiary role, while the interval-3 (diminished seventh) and interval-4 (augmented triad) cycles are marginally used. (This isn't to say that the minor and major third do not figure as intervals in their own right, of course: parallel major and minor thirds are particularly prominent in bars 43-44, 48-51, 64-76, 138-139 and 166-183; and Headlam records consistent evidence showing the interval-3 cycle as a pitch-structural force during the first twenty bars.⁴⁹) The situation contrasts strongly with Berg's approach in the second movement, and in his following work, the *Altenberglieder*, where all six cycles figure strongly.

There are differences, too, in Berg's deployment of whole-tone material. While the string quartet frequently includes whole-tone configurations in the themes and motives, this linear aspect of whole-tone use is generally avoided in the later work, whole-tone sonorities being reserved there to define specific harmonic areas, and often being used for the harmonisation of parts which are themselves moving non-whole-tonally, i.e. stepping

⁴⁵Ibid. page 6.

⁴⁶Headlam (op. cit., page 79) suggests a sum 0 wedge around C for this formation, widening ultimately to the A a minor third below (bars 6-8) and the Eb a minor tenth above in the first violin (its first note, in bar 7).

⁴⁷Noted by Headlam, op. cit., page 81; he also observes a Sum 8 wedge movement between cello and viola in bars 6-9, involving the vertical pairs G-Db, F#-D and F-Eb.

⁴⁸Ibid. page 9.

⁴⁹Op. cit., pages 79, 83 and 84.

by ic 1/11 (semitone/major seventh), ic 3/9 (minor third/major sixth) or ic 5/7 (perfect fourth/fifth).

As has already been shown, many of the motives in the first movement include melodically-orientated whole-tone groupings using a descending four-note scale originating from the *Grundgestalt* 'head' motive (i.e. *a1*, *a2*, *b2*, *b3* and *b4*- Examples 3.5a and 3.5g). Yet frequently the *vertical* harmonic content of the movement has a whole-tone basis, too. Archibald points out that much of the pitch content of the first nine bars is whole-tone,⁵⁰ confirming Perle's description of this passage in terms of alternating whole-tone collections:⁵¹ the initial 'head' motive (whole-tone in all but one of its notes) is answered by a contrasting statement (on viola in bar 5) using notes from the other whole-tone collection, after which the original collection returns in bars 6-8 (dominated by *a2*), only to switch to the alternative grouping again in bar 9 (in all instruments except cello)- Example 3.15. Alternation between elements from the two whole-tone collections continues to be a feature of the harmonic texture at frequent intervals thereafter-

- in the *a3* section, at bars 17-18, 19-20, 22-23, 24-25
- during the whole of the *a1/a2* section of bars 32-40
- in the second subject group at bars 43-44 (*b1*), 47-51 (*b2*) and 58-71 (*b4/b2*)
- in the Development section, at bars 94 and 100
- in the first Recapitulation at bars 105-114 (*a1/b1/a2*), 119-122 (*b3*) and 128-129 (the 'early piano sonata' section)
- through most of the second Recapitulation, incorporating elements of *a1*, *a2*, *b4* and *b2*, from bar 157 to bar 176, and in bars 180-183

(Note that sometimes a held note is 'tied' over, and therefore through, the other whole-tone block, and that sometimes member notes of whole-tone blocks are slightly displaced.)

Alternation of whole-tone blocks is not the only technique used, however. Sometimes Berg aligns a (predominantly) whole-tone voice against a non-whole-tone context, as with the

⁵⁰Berg's Development as an Instrumental Composer', op. cit., pages 97-98.

⁵¹Ibid.

rising T-2 transpositions of the '*head*' motive in the first violin (whole-tone) set against *a3* material in the other instruments (non-whole-tone) in bars 26-31, or else he superimposes one whole-tone voice against another contrasting one,⁵² as between violin and cello in the last three bars of the same passage- Example 3.20, and between violin 2 and cello in the first three quavers of bar 144.

Some instances of a falling tritone (interval-6 cycle) occur in the first movement, originating from the '*head*' motive's boundary notes, initially F-B:

- *a2*'s second and third notes, G-C# (bars 7-8, violin 1)
- the *a3* 'extended' motive's boundary notes, G-C# at its initial appearance (bars 14-16, viola)
- *b2*'s whole-tone scale boundary notes, most frequently Bb-Fb(E) (e.g. bars 48-49, violins)
- *b3*'s G-(D)-C# (cf. the *Grundgestalt*'s F-(Eb-Db-A)-C-B) and F#-C (bar 53, cello)⁵³

Instances of interval-1 and interval-5 cycles are likewise *Grundgestalt*-instigated, by the falling semitones/fourths viola/cello figure of bars 2-3. The perfect fifth emerges as a common anacrusis, e.g.

- the descending C#-F# to the F#-E cadence of bars 8-9, 39-40, etc.
- the ascending F-C to the cello counterpoint to the *a3* 'extended' motive in bar 15
- the ascending Eb-Bb to *b2* in bars 47-48 et seq. (anticipated in bar 46, the viola's C-G, mirrored by the descending D-G in the cello, bars 48 and 50, and developed into a three-note sequence by the cello in bar 51)

The cello's 'open-string' ascending fifths cycle C-G-D-A appears briefly in bars 110-111

The descending perfect fourths of *a1*

- emerge as a *rising* 'circle of fourths' motif in *b4* (e.g. the initial Eb-(F)-Ab-Db in viola, bar 58), although *b4* is later inverted, e.g. violin 1 in bar 77

⁵²As was the case at the start of *Warm die Lüfte*, the fourth Opus 2 song.

⁵³Also Eb-(Bb)-A and D-Ab in the anticipation of *b3* in the cello, bar 45.

- are extended at the end of the Development, in the cello's anticipatory Bb-F-C-G of bar 101
- are developed at the start of each Recapitulation section, in bars 105-109 (cello, then viola) and 153-155
- relate to an extension to the descending fourth element in *b3* at its reprise, i.e. in bars 140-142 where the cycles A-E-B-F#-C# (violin 2, from the fourth quaver of bar 140 to the second quaver of bar 142), Eb-Bb-F-C-G-D (viola, from the second quaver of bar 141 to the final semiquaver of bar 142) and G-D-A-E (cello, from the second triplet semiquaver to the final triplet semiquaver of bar 142) are etched out, and in the consequent falling fourths figures in all four instruments between bars 146 and 148, which ultimately anticipate the *a1* cello fourths at the start of the second Recapitulation in bar 153

Descending and ascending scale segments in semitones become a common feature of the linear textures in all instruments right from the outset of the movement (cf. Mark DeVoto's comments on 'creeping chromaticism'⁵⁴); the principal motivic derivation from the *Grundgestalt*'s three-note semitonal figure (viola, bars 2-3) is the previously-discussed G#-A-Bb 'counter' motive to *b2*. Chromatic ascents/descents become an increasingly persistent feature of the Development, until they dominate (with the perfect fourth) the linear texture of bars 98-101 (Example 3.21): this latter passage, ostensibly derived from *b3* and *b4*, and performing the dual function of central climax and preparation for the Recapitulation, is remarkable for its three-voice sequence of vertical parallelisms:

- minor thirds/tritones, forming six diminished triads (interval-3 cycle), during the first three quavers of bar 98
- four second-inversion major triads, on the fourth quaver of bar 98
- six perfect fourths chords (interval-5 cycle), during the third and fourth quavers of bar 99 and on the first beat of bar 100
- seven augmented triads (interval-4 cycle), from the second quaver of bar 100 to the first of bar 101

⁵⁴Alban Berg and Creeping Chromaticism', op. cit., pages 71-73.

- six pc set 3-5 triads, in the first three beats of bar 101

Further isolated augmented triads occur in the 'early piano sonata' section at bar 128 (A-C#-F), in the violin 1 descent of bars 141-142 (phrases starting on D#, B and G), and in the violins' descending major thirds of bars 151-152 (Eb-G, B-Eb and G-B). Diminished chords are briefly sounded in the 'early piano sonata' passage, too, at bar 126 (third quaver, A-F#-C-Eb) and bar 127 (fourth quaver, Ab-D-F-Cb-D).

All six of the interval cycles appear with some regularity in the *second movement*. As in the *Altenberglieder* (but not the Quartet's first movement), the whole-tone scale figures strongly in some of the motives, most notably in the *marcato* theme. Other elements have also been mentioned already as being part of the themes and motives themselves: the (ics 1,1) cell and augmented triad of the *ritornello*, the fanning semitonal scales of the wedge formations in both the *ritornello* and the *marcato* theme, the fourths-cycle segment in the sextuplet motive, and the descending semitones of the second subject.

Although this second movement is ostensibly thematically and motivically governed, the texture is frequently riven by interval cycle material, commonly used to fill the (semi-vertical) intervallic space between two near points or events, or for the short-term accompaniment of a theme or motive. In order of appearance:

- in bar 8, an alternating fifth/tritone cycle rises in the cello, D-A-Eb-Bb-E; this sequence is balanced by a less obvious falling sequence of the same cycle in the *marcato* theme of bars 5-6, again in the cello, Ab-D-G-C#-F#; furthermore, the *marcato* theme's semitonally-falling wedge notes F-E-Eb (bars 6-7) which fill the major third from F# to the D of the rising sequence is subsequently matched by a semitonally rising F-F#-G (bar 9) which fills the major third from the rising cycle's E to the cello's Ab (which accompanies the start of the lyrical theme in bar 10): the entire sequence in the cello thus informs the whole of the *marcato* theme *and* its transition into the lyrical theme-

Example 3.22a

- in bar 12, a fourths chord Eb-Ab-Db-F# occurs on the third quaver beat- Example 3.23a
- in bars 13-15, the diatonic scale figure in violin 2 is accompanied by rising fourths in the first violin (Bb-Eb-Ab-Db) and falling semitones in viola (Ab-G-F#-F) and cello (D-C#-C-B); the three-part accompanying harmonies produced from these cyclic segments form alternating whole-tone blocks, each having a pc set 3-8/dominant seventh configuration (i.e. D-Bb-Ab, C#-Eb-G, C-F#-Ab and B-F-Db)⁵⁵- Example 3.23b
- in bars 16-18, the cello's descending (ics 4,7) cells (which accompany the lyrical theme entries in violin 2 and viola) display a series of parallel whole tone scales, but also contribute to an almost complete chromatic scale, continuing a chromatic descent already present in the cello's previous three bars (Fb-Eb-D-C#-C-B) by etching out (with octave displacements using each cell's lower and upper notes⁵⁶) Bb-A-Ab-G-Gb-F-E- Example 3.23c
- in bars 24-28, two fifths cycles a tritone apart are simultaneously sounded in the cello (final quaver beat of each of bars 24-26) and the cello and viola (bars 27-28), i.e. Db-Ab-Eb-Bb-F-C and G-D-A-E-B-F#,⁵⁷ while providing also a two-note rhythmic 'tail' to the falling dotted-rhythm figures of the *marcato* theme and the *sextuplet* motive during these bars; because each fifths cycle contains six notes, the full twelve-note aggregate is completed (with no repetitions) by the end of bar 28⁵⁸- Example 3.23d
- in bars 34-38 (and again in bars 217-222) the signature harmonies contain chains of semitonally-descending augmented triads in the lower three 'voices' of the four-part texture- Example 3.23e
- in bar 49, the first reprise of the *ritornello* terminates abruptly on a fourths chord, Db-F#-B-E-A- Example 3.23f

⁵⁵Sequences of alternating whole-tone groupings using 3-8s (and 4-25s) were more widely found in the Quartet's first movement, as shown in Examples 3.27 and 3.28; similar sequences of whole-tone alternation using 3-8s occur in the Chamber Concerto and *Lulu*- see footnote 61 in Chapter 2.

⁵⁶The cello's final note, D, of bar 18 is a misprint: a D# would make this rising figure consistent with the other cells, and would also be consistent with the cello's prevailing falling whole-tone and chromatic scales; D# is confirmed in the manuscript score of the Quartet (ÖNB Musiksammlung F 21 Berg 8), page 21'.

⁵⁷Each fifths cycle is symmetrical at sum 1, while the two cycles together have a sum 7 vertical symmetry- see Example 3.23d.

⁵⁸The first of these tritones is the referential Db(C#)-G.

- starting in bars 72-77 and then continuing in bars 82-87, the Development opens with a vertically-aligned alternating semitone/tritone or interlocking fifths cycle rising in all instruments in turn, i.e. G-Ab-D-Eb-A-Bb-E-F-B-C-F#-G or G (viola), Ab-Eb-D (2nd violin), Eb-Bb-A (1st violin), Bb-F-E (cello), F-C-B (1st violin), (C)-G-F# (1st violin), based on the open string fifths G, D, A and E, plus two further 'phantom' open strings, on high B and F#; this sequence comprises an eleven-note aggregate,⁵⁹ and balances the similar twelve-note sequence of bars 24-28- Example 3.22b
- in bar 78, the first part of the above cycle terminates on an alternating major third/minor third chord, G-B-D-F#-A-C#-E- Example 3.22c
- in bars 114-116, during the transition to the fourth Episode, canonic entries based on the fourth-plus-semitones figure create an abundance of interval cycles: fourths rising in semitones operate simultaneously against minor thirds and tones falling in semitones; these are then followed by descending diminished triads in cello and violins in bar 116, and by descending fourths in bars 116 and 117- Example 3.23g
- in bars 119-122, the fourth Episode starts with rising diminished seventh tetrachords (minor third cycles) in parallel minor sevenths in viola and cello, accompanying the rising diatonic scale figure statement in the second violin; a further diminished seventh tetrachord can be extracted from alternate notes of the diatonic scale figure, combining with the first of the accompanying cycles to form a series of rising pc set 3-8 chords: these chords complement the earlier series of 3-8 chords which accompanied the initial statement of the rising diatonic scale figure in bars 13-15, and are themselves complemented by a falling series of augmented and 3-8 triads, formed once again from diatonic scale figure and diminished seventh material, which follows in bars 133-136- Example 3.23h
- in bars 148-151, the Development ends with a falling fourth/semitone/semitone cycle in the cello, A-G#-Eb-D-C#-Ab-G-F#-Db-C, symmetrical at sum 9 (around an unsounded Bb-B) or, more appositely for the argument on focal centres that follows

⁵⁹The 'missing' high C# needed to complete the 12-note aggregate occurs 24 bars later, in bar 111, and a final resolution might be said to take place on the climactic high D in bar 217 (Example 3.22b).

later, at sums 4 and 2 around D and G; like the cycle which opened the Development, this sequence is fashioned around open strings (A, D, G and C)- Example 3.22d

- in bars 151-153, the Recapitulation opens with a plethora of interval cycles, accompanying the *ritornello*: open fifths in the bar 151 chords (cello, viola and second violin, on C, G, D and A), simultaneously rising fourths (cello) and rising and falling semitones (the other three instruments) in bar 152 (including the first demi-semiquaver of bar 153), and an array of simultaneously rising fourths (cello), major thirds (violin 2) and semitones (viola)⁶⁰ in bar 153; the cello's low C# at the end of bar 153 completes a nine-note fourths cycle in the cello overall, symmetrical at sum 6, and centred on the octave As at the start of bar 153- Example 3.23i
- in bar 169, the *stentato* figure's repeated D is joined by the 'head' motive's B and the first dyad of the viola's descending semitones/fourths figure to form a diminished seventh chord F-Ab-B-D (although underpinned in the cello by the C# pedal which has been extant at various octave levels since bar 153)- Example 3.23j
- in bars 187-188, the cello's sextuplet motive descending fourths are extended by two further notes, resulting in a sequence B-F#-C#-G#-Eb- Example 3.23k
- in bars 230-232, the lower strings settle onto a diminished seventh chord, C#-G-E-Bb (plus *stentato* D in 1st violin), and in the movement's final bar (bar 232) each instrument displays elements of rising interval cycles in their upward flourishes from this chord: major thirds (augmented triads) in violin 1, fourths in violin 2, fourths and semitones in the viola, and alternating fifths/major thirds in the cello, i.e. C#-G#-C-G-B-F# (sum 7 around D#-E, the viola's opening notes of the bar)- Example 3.23l

Certain inversional symmetries also fulfill the function of accompaniment through the filling of intervallic space:

- in bars 29-32,⁶¹ the cello has sum 8 PI-dyads arranged temporally/symmetrically about an unsounded E (almost: the F and D do not quite comply as a pair), and then has sum

⁶⁰With one tone inserted: Headlam observes that this allows the targeted chord at the end of the alignment of interval cycles to be whole-tone (op. cit., page 77).

⁶¹The score has eleven bars between the bars designated 20 and 30: it is therefore necessary to call the bar before bar '30' bar '29a'.

2 PI-dyads similarly arranged about an unsounded C#; these symmetries accompany *marcato* theme material in the upper three instruments- Example 3.24a

- a similar symmetrical arrangement of sum 8 PI-dyads in bar 40, again in the cello, centres about E (as before, almost: the G and C do not quite comply as a pair)- Example 3.24b
- the cello part which accompanies 2nd theme material in bar 57 displays two inversive symmetries, one in the rising second part, in the second half of the bar, about a sum 2 C# axial centre,⁶² and the other more comprehensively arranged throughout the bar about an unsounded focal D (sum 4)- Example 3.24c
- the bar 232 alternating fifths/major thirds sum 7 inversive symmetry in the cello (around the viola's D#-E, Example 3.23f) is supported by a further sum 7 symmetrical arrangement taken from all four instrumental parts about an Eb-E two octaves above, i.e. F-Bb-Db-D-Eb-E-F-Gb-A-D- Example 3.24d
- the intervallic space of bar 232 displays two further instances of symmetrical arrangement: one of sum 11, at three separate levels an octave apart (about an unsounded B-C each time), and one of sum 8, at various levels about actual and unsounded Bbs and Es⁶³- Examples 3.24e and 3.24f

Wedge formations within principal themes of this second movement have already been mentioned, i.e. in the *ritornello* (sum 8, about Bb), the *marcato* theme (sums 2 and 8, about G and Bb) and the signature harmonies (sums 3, 7 and 11). Further instances of wedge formations occur regularly throughout, but are most particularly used for instigating some of the structurally significant points of change in the score; all of the following have elements of sum 4 inversive symmetry with a D centre or sum 2 symmetry centred on G:

- a narrowing wedge (at sum 4) in viola and first violin converges in bars 3-4 onto D, the *stentato* figure note which accompanies the start of the *marcato* theme in bar 5- Example 3.25a

⁶²This unsounded C# being sounded in the *first* half of the bar.

⁶³Complementing those of the opening three bars- see Example 3.26a.

- the D-E-F# and C-Ab elements of the *marcato* theme, prominent throughout bars 29-33, finally widen, wedge-like (at sum 2), onto G in bar 34,⁶⁴ at which point the signature harmonies begin- Example 3.25b
- canonic entries in all four instruments in bars 62-63, based on the *ritornello*'s rising Db-A (i.e. Db/C#-A in cello and in violin 2 and an inverted form, E-Ab, in viola and in violin 1), settle onto two narrowing sum 6 wedges, while at the same time the inner voices (viola G-F#-F and second violin A-Bb-B) converge onto the *stentato* figure D at the start of the bar 64 transition (a sum 4 wedge)- Example 3.25c
- a narrowing wedge in the cello and first violin in bars 66-71 (at sum 2), and prevailing notes, C and D, in viola and second violin (sum 2 PI dyads), converge (with an octave displacement in the first violin in bar 70) onto the *stentato* figure G in bar 72 at the start of the Development- Example 3.25d
- the lower three strings' Db/C# and first violin Eb converge, at the start of the Recapitulation in bars 150-151, onto the *ritornello*'s first note, Ab (the other axis at sum 4)- Example 3.25e
- a sum 4 wedge in the inner voices helps precipitate the inception of the *Pesante* climax at bars 216-217 (with D the prominent pitch in violin 1 above)- Example 3.25f

Example 3.26 shows that focusing on E is also a strong feature, particularly in the expository parts of the movement. The sum 8 wedge converging on E in bars 1-2 is associated with several other sum 8 PI-dyads in all instruments during bars 1-3 (Example 3.26a), and in the cello's *marcato* theme in bars 5-7 (Example 3.26b),⁶⁵ and there are many

⁶⁴An octave G-C# (i.e. with the cello a tone lower than written in the published score) would make a more logical resolution to the movement of parts: the descending tritone figure does not occur in this parallel minor sevenths arrangement anywhere else in the movement, but as low G-C# the figure does become a prominent and persistent feature in the cello later in the movement, in bar 150, bars 170-178 and bars 217-232. Berg did in fact originally write G-C# in the cello part here: an early draft manuscript of the opening of the second movement, which stops abruptly at bar 44 (ÖNB Musiksammlung F 21 Berg 66, pages 4-5'), has G-C# in the cello in bars 34-36, but altered to A-Eb in the first of these bars; the subsequent full manuscript of the quartet (ÖNB Musiksammlung F 21 Berg 8) has the alteration A-D# in all three bars, as do all printed copies, including the one which was proof read by Berg for the publication in 1920. Presumably Berg decided to opt for the more uncomfortable sound of parallel sevenths at this point; a residue of the original intention to have octaves remains in the unison of viola and cello in bars 37-38.

⁶⁵See G. Perle, 'Berg's Master Array of the Interval Cycles', op. cit., pages 7-8. It is interesting to note that the bars 1-2 wedge in cello and second violin is missing in the early draft manuscript of bars 1-44 of this movement (ÖNB Musiksammlung F 21 Berg 66, page 4), suggesting that this figure was not part of the original conception.

inversional symmetries around Es and Bbs during these bars. It will be recalled that the *ritornello's* wedge (bars 2-3, in violin 1, Example 3.26a) is also at sum 8: a similar wedge occurs in the second violin in bars 27-28. A sum 8 symmetrical orientation concludes the signature harmonies passage at bar 40 (G-Ab in violin 1 and Db-C in viola) and reappears in the violin parts in bars 44-45, while a sum 8 wedge also occurs between cello and viola in bars 42-43 (Example 3.26c). Sum 8 partially resurfaces during the reprise passages of bars 171-178 (cello) and 190-191 (cello and viola)- Example 3.26d, and is one of the inversional forms inherent in the bar 232 rising *arpeggio* figures (Example 3.24f).

2. Transpositionally invariant set classes (TINVs)

Richard Cohn has dubbed a certain generic group of pc sets 'TINVs' ('transpositionally invariant set classes'⁶⁶-see Chapter 4, Part B.3, where a full description can be found).

Far fewer of these TINVs occur in the Quartet than in Berg's next work, the *Altenberglieder*.

Most notably, the *first movement* has no obvious octatonic or pc set 4-9 constructions; the few augmented triad and diminished seventh appearances have already been documented above. By contrast, pc set 4-25 (the French sixth) is a frequent constituent within the extensive whole-tone content of this movement,⁶⁷ usually acting as a static sonority at structurally pivotal and/or cadential points in the score, i.e.

- at the conclusion of *a*2, and just prior to the onset of the *a*3 section, in bar 9 (Bb-C-F#-E in violins, but with other pitches, G, A and D in cello and viola)
- as the final sonority at the end of the first subject group, in bar 40 (E-G#-D-Bb, preceded in bar 39 by another 4-25, C#-G-Eb-A, from the contrasting whole-tone collection)
- at the end of the second subject group's introductory passage, in bar 47 (C#-G-A-D#)
- at the transition between *b*2 and *b*3 at the end of bar 51 (Bb-F#-C-E)

⁶⁶Richard Cohn, 'Properties and Generability of Transpositionally Invariant Sets', *Journal of Music Theory*, Vol. 35, Nos. 1-2 (1991), 1-32.

⁶⁷The French sixth had notably been used previously by Berg as the basis for the second Opus 2 song.

- at the transitory moments of stasis between *b4* and *b2*, in bars 60-61 (D-E-Ab-Bb, in cello and viola)
- at the climax of the *b3* development, in the chords of bars 90 (Eb-C#-A-G) and 92 (F-Eb-B-A), part of a rising sequence of chords in bars 90-94- Example 3.27
- at the *a2* cadence of bar 118 (as at bar 9, again using F#-Bb-C-E, and in the same context)
- at the *b4* to *b2* transition of bars 159-160 and 162 (as at bars 60-61, again using D-E-Ab-Bb in the cello and viola)

The 4-25 tetrachord also figures

- melodically, as part of *b3*, during bars 52-57 (cello/viola/violin 1) and again in bars 138-139 (violin 1)- Example 3.28a
- as chords, in the 'early piano sonata' section (bars 127, 129 and 130)- Example 3.28b
- as chromatically descending sequences of chords, in bars 172-173 and in bars 182-183- Example 3.28c

The French sixth (4-25) can be traced right back to the opening of the movement, to notes 1, 2, 4 and 6 of the initial '*head*' motive (F-Eb-A-B), and to notes 1, 2, 3 and 5 of *a2* in bars 7 and 8 (Eb-G-C#-A); 4-25 was originally even more germane to the '*head*' motive, as early sketches show (ÖNB Musiksammlung F Berg 49, page 2, and ÖNB Musiksammlung F Berg 7, page 13, both of which have *five* rather than six notes for the motive, i.e. F-Eb-A-C-B).

Some prominent second movement TINVs have already been discussed: the tritone (pc set 2-6), the augmented triad (3-12), the diminished seventh (4-28) and the twelve-note aggregate (12-1). Examples of the pc set 4-9 tetrachord occur somewhat incidentally, as in bars 8 (A-Eb-Bb-E, in the cello), 10-11 (A/Eb and Bb/E, in the violins) and 13-14 (D/Ab and C#/G in cello and viola). Once again (as was found to be the case in the first movement), the French sixth (pc set 4-25) is by far the most common, and acts here as a conspicuous pivotal harmonic agent at three points:

- before the first *stentato* figure Ds, at the end of bar 3, i.e. with the chord G-A-C#-Eb, where the C# and Eb occur as the final sum 4 wedge dyads and as 'satellites' to the ensuing D, although the A and C# act at the same time as quasi-tonal 'dominant' and 'leading note' to this same D
- likewise before the Development's initial *stentato* figure Gs, at the end of bar 71, i.e. with the chord C-F#-Ab-D, where the F# and Ab occur as the final sum 2 wedge dyads and, by analogy, as 'satellites' to the ensuing G, while the F# and D act also as 'leading note' and 'dominant' to the same G
- concurrently with the onset of the *stentato* figure Ds in bar 64, with the chord C#-F-B-G; although not symmetrically arranged, the inner notes of the chord are symmetrically placed around the reiterated D

The viola/cello descending tritones of bars 34-36 also form a 4-25 grouping, D#-A-C#-G,⁶⁸ a 4-25 chord F-B-Eb-A occurs during the Second theme at the start of bar 59, and again in the corresponding place in the Recapitulation (bar 205), and the same collection (F-A-B-Eb) is sounded in the upper strings at the end of bar 153.

3. Aggregate systems

The *first movement* has but one clear-cut 12-note aggregate, the melodic content of the cello in bars 45-47- Example 3.29. A pc set 6-20 (hexatonic) grouping appears in the second violin, bars 31-32, and recurs in bars 32-34 (the G-Bb-B-D-Eb-F# 'held' components in the upper three voices)- Example 3.30; a further grouping occurs in bars 123-126 (a recurring component, Eb-E-G-Ab-B-C, in viola and first violin)- see Example 3.13c. Diatonic aggregates are not in as much evidence here as they are at times in the second movement and in the Opus 4 songs, excepting perhaps the suggestion of G minor, in bars 9 and 32, and an F major area towards the movement's conclusion, in bars 175-176 and in bar 182- see Example 3.31a. The G minor 'tonality' is to some extent prepared through a sequence of non-related centres in bars 28-31- see Example 3.31b.

⁶⁸But see footnote 64 in this chapter.

Venn Diagram 4.2 shows the interface between Diatonic, Whole-tone and Octatonic aggregate systems (the last of which can be ignored in the present context). It can be seen that pc sets 4-21, 3-6 and 3-8 form the common link between the Diatonic (major) system and the Whole-tone. Pc set 3-8 (0,2,6) is a particularly significant grouping, here: as well as being one of the two possible whole-tone trichords (along with 3-6), it is also the pc set name for the diatonic 'dominant seventh' chord without a fifth, i.e. root, third and seventh. Jim Samson has spotted Berg's persistent use of this '7/3 unit' in the second Recapitulation of this first movement (called 'coda' by Samson), generally in a seventh-plus-augmented fourth harmonic layout (reading from the bass upwards):⁶⁹ he assigns a consonant (rather than a tonally coherent) quality to these tonal allusions, but it can also be seen that each of these 'diatonic' sevenths appears within a clear whole-tone context (note the correspondence with the 4-25 sequences of Example 3.28c). After isolated instances in bars 158-160, these '7/3' chords start to appear in earnest from bar 169, continuing until bar 183. An origin for these 3-8 groupings can be found, once again, in the '*head*' motive of the *Grundgestalt* (i.e. as notes 2, 3 and 4, Eb-Db-A, but also as F-Eb-A, F-Eb-B, F-A-B and Eb-A-B). 3-8 has to be, of course, the only possible constituent trichord within the many instances of 4-25 already cited (e.g. in Examples 3.27 and 3.28), and is obviously also a constituent part of most of the other whole-tone formations to be found throughout the movement (Examples 3.15, 3.16 and 3.20).

Some other (whole-tone) appearances of 3-8 are:

- E-D-Bb in the lower three parts in bars 33-35 (the lower 'pedal' notes of their oscillating dyads; together with the first violin F#, these form pc set 4-24)
- G-Eb-A and G#-D-Bb in the upper three parts, bars 39-40 (the 4-25 to 4-25 cadential progression)
- a series of chromatically rising trichords in the lower parts, bars 90-93- Example 3.27
- G-F-C#, A-G-Eb and B-A-F in violin 1, bars 94-95, an expanded form of part of b3- Example 3.32

⁶⁹J. Samson, op. cit., page 163.

In the *second movement*, it has already been mentioned that one twelve-note aggregate appears complete through the consecutive cycles of tritone-related fifths in bars 24-28 (Example 3.23d); another occurs in the first violin *arpeggi* of bars 52 and 53.⁷⁰ Octatonic groupings appear just once, in the cello *arpeggi* of bar 57, where the lower and upper *tessiturae* display different octatonic bases and are symmetrically arranged at sum 4 about an unsounded pivotal D- Example 3.24c.⁷¹ Hexatonic groupings seem not to figure at all.

Whole-tone, Diatonic and Chromatic constructions are far more commonly employed, however, and each even seems to operate as a unifying system in places.

Extended chromatic scales in the second movement can be classed as follows:

- as simultaneous wedge progressions in contrary motion, commonly found in the motives themselves, and often associated with symmetries and directed motion centring on D, G and E- see Examples 3.25 and 3.26
- as occasional simultaneous progressions in parallel motion, normally inserted for reasons of emphasis or colour, e.g. those in descending tritones (viola and cello, bars 13-15), major thirds (descending in viola and cello as harmonic accompaniment to the *marcato* theme, bars 23-24, and ascending in 2nd violin and viola, bars 132-133) and descending fourths (cello, bar 58), as well as those in consecutive augmented triads (violins, bars 34-38: the signature harmonies)⁷²
- as goal-directed ascending or descending lines, e.g. in the violins, bars 23-28 (striving towards the octave Cs of bars 29-32), and in all four instruments in bars 154-164 (rising/falling to notes of one of the whole-tone collections, and initially to the note C in particular) and bars 210-217 (ultimately to the D7/Gm amalgam chord of bar 217)- Example 3.33
- as a specifically thematic feature, in the second subject material of bars 54-60 and bars 200-207 (both descending and ascending)

⁷⁰This violin *arpeggio* appears to be one of the first elements of the second movement of the Quartet to be sketched, appearing as an isolated figure in ÖNB Musiksammlung F 21 Berg 7, page 48.

⁷¹Six of the notes of the rising *arpeggio* in the second half of the bar also display an octatonic learning, symmetrical at sum 2 around an imaginary C#- also shown in Example 3.24c.

⁷²Contrary motion *and* parallel chromatic lines appear with some regularity during bars 177-192.

Whole-tone material is used in the following ways in the second movement:

- as alternating harmonic blocks from each collection, where the parts themselves move non-whole-tonally, i.e. in semitones, minor thirds, fourths, fifths, major sixths, etc. (a topic described by Headlam,⁷³ and explored more fully in Part 3.2); examples generally appear at points of transition or repose, such as bars 3-6 (the move to the *stentato* figure on D, and the start of the *marcato* theme), 13-15 (accompanying the diatonic scale figure), 30-34 (the move to the signature harmonies), 40-41 (at the start of the transition to the second *ritornello*), 54-57 (the start of the Second subject), 62-73 (the move first to the *stentato* figure on D and then to the one on G), 118-129 (the start of Episode 4), 153-154 (the start of the Reprise), 190-193, 195-200 (leading into the Second subject reprise), 203 and 209-211 (the *marcato* theme)
- as simultaneously superimposed groupings from both collections, where a melodic line in one part is set against counterpoint/s or accompanying harmonies in another part or parts; examples generally appear at points of tension and greater expressive dissonance, such as bars 1-2 (a viola line of changing whole-tone aspect set against the cello/violin 2 wedge formation, Example 3.34a), 34-39 (the signature harmonies, Example 3.34b), 64 (the viola's *stentato* figure D against the prevailing French sixth chord in cello and violin 1, Example 3.34c), 154-162 (major thirds from one collection against major thirds and the pedal C# from the other collection, Example 3.34d), 164-169 (*stentato* figure D against the other collection's pedal C# and 'head' motive, Example 3.34e) and 177-186 (an extension of the signature harmonies' whole-tone dichotomy: G, A and B set against notes of the other collection, Example 3.34f)
- as goal-directed ascending or descending lines, such as in bars 12-22 (cello and violin 1, leading to the return of the *marcato* theme in bar 23), 129-141 (in each instrument in turn, rising from D to Fb, leading to the violin 1 pedal 'satellite' Eb of bars 142-150) and in bars 212-216 (cello, G descending to A, eventually to descend to G *via* Ab at bar 217, the start of the Coda)- Example 3.35

⁷³Op. cit., pages 63 and 68.

Diatonic allusions in the second movement include:

- frequent T-5 and T-7 transpositional relationships between various statements of the principal themes, the most common pitch relationship made explicit through these transpositions being between D and G, i.e. the *ritornello*'s second note, G (bar 1) and final note, D (bar 4), becoming D in bar 223 and G in bar 226 (the G of the cello's referential low G-C# falling tritone) *via* T-7 and T-5 transpositions, the *marcato* theme's focal G (bar 6) becoming D at bar 217 *via* T-7, and the anticipatory variant's first and seventh notes, G (bars 2-3), becoming D in bars 185-186 *via* T-7, thus matching the pitch level of the T-2 presentation of the *marcato* theme four bars earlier
- scalar figures such as the *marcato* theme's rising tone-tone-semitone sequence (i.e. D-E-F#-G, as in bars 5-6) and the diatonic scale figure's patterns of tones and semitones (e.g. the second violin's 'C major' sequence of bars 13-15)
- the use of open string fifths in the *stentato* figure passages, most notably the use of D in bars 4-8, 64-71 and 165-170, and of G in bars 72-73
- the appearance of quasi-tonal chords such as
(whole-tone) 'dominant sevenths' (3-8s⁷⁴) in bars 13-15 (in Eb/Ab/Db/Gb⁷⁵-Example 3.23b), and (whole-tone) French sixths (4-25s), resolving 'flattened submediant'-like⁷⁶ in bars 3 (onto D), 5-6 (onto G), 33-34 (onto G/D), 64 (onto D), 71-72 (onto G) and 152 (within a sequence of dominant seventh-like chords at the start of the Recapitulation in bars 152-153, embracing C/B/F/E/A/D/C),
4ths chords, in bars 12 (Eb-Ab-Db-F#⁷⁷), 39 (E-A and Eb-Ab-C#), 49 (Db-F#-B-E-A) and 174 (C-F-Bb-Eb),
a 'diatonic' thirds chord, in bars 76-78 (G-B-D-F#-A-C#-E, i.e. D major),
a tonic/dominant amalgam chord, at the start of the Coda in bar 217 (G minor/D7),
a V9 based on a diminished seventh, in bar 169 (in F#?),

⁷⁴Pc set 3-8 being common between the Diatonic and Whole-tone systems.

⁷⁵This 'flat side' chord sequence acts bitonally against the 'white-note' diatonic scale figure in the second violin.

⁷⁶The French sixths in bars 3 and 71 have an element of 'Neapolitan sixth' (first inversion of the flattened Supertonic) about them, too, in the way that they resolve onto D and G respectively.

⁷⁷c.f. the bars 13-15 sequence, note 158 above.

a vii9 based on a diminished seventh, in bars 230-232 (in D), and

a pure minor triad, in bar 232 (D minor)

- the emergence of \underline{D} and \underline{G} as regular focal centres for the second movement, through the above four areas of 'tonal' occurrence, and through the previously-described evidence of focus onto these two pcs through invariant pitch, transpositional, interval cycle and wedge-formational material; these focal centres become the subject of Part C.3 below

Part C. Structural networks

The interaction of each movement's whole-tone, motivic and invariant elements, together with other more traditional forms of linkage and elision, can allow a descriptive network of events and processes to be postulated, and can enable an attempt to be made to satisfy Pople's requirement for a 'cohesive complex of technical ideas' derivable from 'a network of relationships in which some kinds of referential artefact are shown to inherit properties from, or transfer them to, other artefacts or classes of artefacts'.⁷⁸ Such links are not merely referential or normative in function, they form part of a structural and developmental plan, where theoretical relationships become explicitly 'composed into' the transformational fabric of the music. Central to this principal in the first movement is the vertical use of whole-tone material as a vital structural force; in the second movement it is the more specific question of focal pitch: the dichotomy between D and G.

1. Networks of transformation and linkage

Adorno has described the concluding coda of the *first movement* (i.e. the final five bars) thus: 'A splintering into remnants until the end: the main motive ... over the original accompanying harmonies'.⁷⁹ While this observation conforms with his more general feeling, that 'Berg's expression [is] ... maintaining itself by squandering itself',⁸⁰ these

⁷⁸Op. cit., page 398.

⁷⁹Op. cit., page 59.

⁸⁰Ibid. page 39.

concluding bars also demonstrate Adorno's notion that Berg's style has an objectivity which allows his expression to 'once again make nothingness into something':⁸¹ this latter phenomenon arises here through a *rebuilding* of the '*head*' motive during the last six bars. This final 'reconstruction' of the '*head*' motive is but one of a number of reconstructions which have occurred during the movement, and which cause some of the motivic relations (i.e. of other motives to the '*head*' motive) to be made explicit, as part of the actual compositional narrative:

- in bars 24-28, an initial *a3* phrase C#-C-A in violin 1, itself a consequence of the *a3* 'extended' motive sequence which started in bar 14, is progressively transformed into the '*head*' motive at its T-0 level (the first of the climactic sequence of bars 27-33)
- in bars 99-105, the persistently-reiterated notes Eb-(D)-Db-C in the first violin (derived from *b3*'s 'tail', bars 45-46 and 53-54 in the cello, and now developed in bars 98-103) eventually resolve downwards a further semitone to B in bars 103 and 105, thus creating the basic pc framework of the Recapitulation's first statement of the '*head*' motive at T-0 in bars 105-106 (in violin 2)
- in bars 122-125, an *a3* sequence in violin 2, starting B-Ab-G and D-B-Bb, is then continued entangled with the '*head*' motive, i.e. F-G-F-Eb-B-D-C# and B-C#-B-A-F-Ab-G (*a3* notes underlined), where *a3* coincides with notes 2, 5 and 6 of the '*head*' motive- Example 3.36; thus one of the three theoretical presentations of *a3* in the *Grundgestalt* (Example 3.5b) is here 'composed into' the fabric of the score
- in bars 130-134, a fixed pitch element F (in violin 1, bar 130-132, and violin 2, bars 133-134) leads downwards, via Db and C (and low A in the second violin, bar 132) to B, thus anticipating and echoing the two violins' T-0 statements of the '*head*' motive in bars 132 and 134 (technically, the first violin's F-Db-F-C of bars 130-131 derives from the *a3* 'extended' motive's notes 4 to 7).⁸² The second violin's A-F-Db-F-C of bars 132-133 returns twice as a reconstructive device for the '*head*' motive at T-0 near the end of

⁸¹Ibid. page 39.

⁸²Note that the similarly-signalled G to Db (T-2) statement of the '*head*' motive in the viola, bar 133, has an altered note, C instead of B, due to the too-low tessitura of the phrase; the cello's contribution to the '*head*' motive in bar 134 (at T-8) is likewise signalled in the previous bar.

the movement, firstly unanswered in bars 175-176, and then in resolved form during the rebuilding process of the final six bars- see Example 3.37.

Headlam describes a final process, through which the last statement of the T-0 '*head*' motive of bars 184-185 is reconstituted.⁸³ The bar 175 F-Db is pivotal to this process of reconstruction, since it assumes three distinct roles:

- that of wedge-like tail to the first violin's Ab-to-D '*head*' motive of bars 174-175, which exactly repeats (an octave higher) the original viola '*answer*' of bars 5-6
- that of notes 4 and 5 of an incomplete *a3* '*extended*' motive D-F-Db-F-C in bar 175,⁸⁴ which repeats the pitches of the same motive as it appeared in violin 1 in bars 130-132 (i.e. the notes Gb-F-D-F-Db-F-C)
- that of initiating element in the reconstruction itself, which proceeds F-Db-C-B in bars 175-177 (taking in the start of *b4* on the way) and again in bars 182-183, and F-Eb-C-B in bars 183-184⁸⁵

The bonding of motives in the first movement is often contingent with the movement of parts and the general development towards a goal. DeVoto suggests (of bars 10-31) that motives are connected by semitonal '*creeping*'.⁸⁶ However, during bars 5-16 and 32-33, at least, there seems to be a pattern to the '*head*' motive entries, in that each seems to be triggered by the note a *whole* tone above (creating an extension to the whole-tone make-up of the motive so that the complete six-note collection is present): thus,

- the viola Ab motive of bar 5 has a prior Bb in second violin
- the cello G motive in bar 11 has A in viola
- the cello G# motive in bar 13 has Bb just before in viola

⁸³Op. cit., page 86.

⁸⁴This motive recurs in bar 182. It is worth noting that bars 175 and 182 are identical for expedient as well as for constructional reasons: in the Quartet manuscript (ÖNB Musiksammlung F 21 Berg 8, page 17) Berg initially had a shorter ending to the movement, with bar 175 resolving into a shortened (2-bar) version of what is now bar 183 *et seq.*; the fuller definitive ending is to be found in the same manuscript (pages 20-20').

⁸⁵*a3*'s presence within the '*head*' motive as its notes 2, 5 and 6 is again overtly and compositionally confirmed here, since Eb-C-B (*a3*) takes its place in the fully reconstructed (and final) F-to-B '*head*' motive statement of bars 184-185.

⁸⁶'Alban Berg and Creeping Chromaticism', op. cit., page 71.

- the cello C motive in the same bar springs from the final note of the motive just finished, D
- the cello E motive in bar 16 follows an F# in the same instrument
- the second violin E motive in bar 32 has F# in violin 1
- the viola Ab motive in the same bar is preceded by Bb (which is violin 2's final motive-note, too)
- the cello Bb motive in bar 33 is preceded by a C in the same instrument

Elsewhere, the '*head*' motive follows a variety of patterns of entry, or appears arbitrarily according to the transpositional level required; attention can be drawn to

- the first violin's whole-tone ascents of bars 27-30
- the rising fourths-cycle entries of bars 123-124 in cello
- the T-0 statements in violins, bars 132 and 134, are part of a series in all four instruments in bars 132-134 where each final note resolves (and continues) a semitonal descent already present in each part, e.g. violin 1's B of bar 132 which is a continuation of the D-Db-C of bars 131-132
- the 'expressive' entries in parallel thirds in viola and cello in bars 169-170

Yet, even the *a*3 section of bars 10-31 has relational patterns between statements of the motive, with inversional symmetries in the simultaneities shown in Example 3.19 (at sums 10, 2, 3, 8 and 0), with certain notes carried over from cell to cell as invariant elements (joined by dotted line in Example 3.2), and with certain Lewin-*esque* forms of transformation (shown by arrow in Example 3.2);⁸⁷ of these latter,

- the T-4 and T-8 transpositions produce hexatonic relations between cells
- the T-3, T-6 and T-9 transpositions produce octatonic relations between cells, most notably in the sequence of bars 16-18 and 25-28 which uses the octatonic scale C#-D-E-F-G-Ab-Bb-B

⁸⁷David Lewin, *Generalized Musical Intervals and Transformations* (New Haven: Yale University Press, 1987).

- the T-1 inversion in bars 19-20 (about D and Eb) produces a hexatonic relation between cells
- the overlapping cells (0,3,4,7: pc set 4-17 and 0,1,4,5: pc set 4-7) of sum 11 symmetry form a 'construct' of B-C or F-F# centred areas in bars 13, 16-17 and 22-23, which is to some extent supported (not shown in Example 3.2) by the C-B-centred chromatic scale in violin 1, bars 14-15, and outer notes F-Gb in cello and viola, bar 15, by the augmented octave F-F# in the cello, bar 16, by F-F# dyads in bars 20 (viola), 22 (violin 2) and 23 (viola), and in bar 23 by the second violin C-B major seventh

Links between sections of the first movement often follow the simple expedient of allowing the new phrase to repeat notes from the old, or to move by semitone step; thus

- at the start of *a3* in bar 10, the violins resume the same pitches, C and E, and the cello falls a semitone
- at the start of *b1* in bar 43, the violins' A and C# are a continuation of a small wedge moving from the G-Eb and G#-D dyads in viola and violin 2, bars 38-40- Example 3.19
- at the start of *b2* in bars 47-48, violin 1 converts D# to Eb, and the cello moves up a further semitone to D
- at the start of *b3* in bar 51 (cello) the first two notes, A-Bb, are part of the final of a series of *b2* 'counter' motive statements of G#-A-Bb in the cello, in bars 48-51
- at the start of the Development in bars 81-82, violin 1 rises a semitone from Eb to resume *b4* at T-0, violin 2 converts its A# from bar 78 (or takes up violin 1's Bb from bar 78) as the first note of a statement of *b4*'s notes 2, 3 and 4 in augmentation (i.e. Bb-C-Eb), the viola takes up its F-E and F#-E from the previous few bars as a statement of the first three notes of *b4* in inversion (i.e. F-F#-E), and the cello continues (displaced by three octaves) its semitonal descent of bars 76-80- Example 3.38; these figures then persist into bars 83-85
- at the start of the Recapitulation (bar 105), the viola/cello semitones/fourths figure has been prepared during the preceding bars, as has the violin 2 '*head*' motive through violin 1's Eb-Db-C-B (described at the beginning of this section)

- at the return of *a3* in bar 119, the top three parts repeat the notes of the previous bar, while the cello moves by minor ninth 'step' (i.e. compound semitone step) in the following bar
- at the inception of the 'early piano sonata' section, the initial harmony at the start of bar 126 results from the *a3* and *a1* phrases of the previous bar, while the cello's Ab in the next bar completes an occurrence of the *b2* 'counter' motive in retrograde (Bb-A-Ab) which started (in bars 125-126) as the last two notes of the 'head' motive; the only 'new' item in bar 126 is the *a3* in inversion in viola (F#-F-D); the 'early piano sonata' section also repeats, in bar 128, the F-A-C# augmented triad of bar 113

Berg was able to seamlessly incorporate this close quotation from the early piano sonata into the fabric of the movement, in bars 126-130, because the quotation opens with a 'ready-made' *a3* cell (Gb-F-D, written as F#-F-D in the viola, bars 126-127) and then proceeds to 'pre-quote' *b2* and its 'counter' motive in its sequence Bb-A-Ab-Gb-E, underpinned by G#-A-Bb in a 'tenor' voice (played by violin 1 and violin 2, bars 129-130). Of course, these motivic connections may have fitted the bill at this point as DeVoto appears to be suggesting,⁸⁸ but it also seems possible that the earlier work provided a pre-compositional source for at least two of the later work's motives, and perhaps for its whole-tone procedures as well,⁸⁹ such as those displayed earlier during the opening seven bars of the Development- Example 3.39

In the second movement, the *ritornello* acts not just as a referential rondo theme. It forms part of the developing discourse by always being signalled by other recurrent elements, and by itself pointing the way towards new developments or motivic entries:

Notes from the bars 1-3 *ritornello*

⁸⁸Ibid., page 72.

⁸⁹Rosemary Hilmar has noted that Berg's early student quartets are 'preparatory studies along the path which leads to a work such as the string quartet, opus 3', and that in an early piano Variations on a Theme by Schumann 'linear movement creates harmonic clashes which hint at the future opus 3' (Variation 4), while the final variation 'reflects all the intensity of opus 3': 'Alban Berg's Studies with Schoenberg', *Journal of the Arnold Schoenberg Institute*, Vol. 8, No. 1 (1984), 7-29 (pages 15-16).

- are anticipated by the first movement's final melodic phrase, i.e. the first three notes, Ab-G-F# are a recurrence of the Ab-G-F# in the second violin at bar 185 of the first movement
- anticipate (through the same Ab-G-F#) the sum 8 PI-dyads of the *marcato* theme (second movement, bars 5-6)

Notes from the bars 48-49 *ritornello*

- are anticipated by the Ab-G of the first violin, bar 45 (imitated by the second violin in bar 48), and by the C#-D-A-Bb (re-ordered to A-Bb-C#-D) of the second violin, bars 46-47 (imitations of this four-note group then occur against the *ritornello* in cello, violin 2 and viola)
- are themselves taken up by all four instruments (i.e. Db-A, bars 49-51), and then lead, in viola and cello, and through a process of interval expansion, to the rising major seventh (the diminished octave F-F#, violin 2) of the Second subject

Notes from the bars 60-62 *ritornello*

- are anticipated by Ab-Gs in the viola, bars 59 and 60 (spelt G#-G), and second violin, bar 60 (imitated by violin 1 in bars 63-64)
- are themselves taken up by the canonic entries of bars 62-63 (again, initially the augmented fifth/minor sixth, Db-A); these canons initiate the return of the *stentato* figure on D, bar 64 *et seq.*

Notes from the bars 151-153 *ritornello*

- are anticipated by the Ab-G of the cello, bars 149-150, and by the same instrument's A-Bb-C#-D, bars 144-145
- themselves lead, *via* the Ab(G#)-A-Bb-B-C rising phrase of the violins and viola, bars 154-156, to the unison C# of bars 164-165 and thus to the *stentato* figure on D of bar 165 *et seq.*

Notes from the bars 222-226 *ritornello*

- are anticipated by the Eb-D of the signature harmonies, bars 217-221 (heard again in bar 226)
- themselves lead to the cello's G-C# falling tritone of bar 226

Bars 23-63, the passage extending from the first repeat of the *marcato* theme up to the transition into the Development (and including the first and second reprises of the *ritornello*), show a continuity of transformation involving several syntactical parameters-

- *rhythm*- the falling dotted-rhythm figure from the *marcato* theme, the second violin's G-C#-F# of bar 24, becomes associated with the similarly orientated tail to the sextuplet motive, G#-F#-E in the first violin, during bars 25-28, reappears (rhythmically) in the 'tail' to the fourth-plus-semitones figure (bar 38) and then informs the association in bars 42-44 between the sextuplet motive and the anticipatory variant (again, through its newly acquired tail, bringing the variant closer in cast to the *marcato* theme)
- *invariant pitch*- the dotted-rhythm tail to the anticipatory variant (in bar 44) also reproduces the descending tritone, G-C#, of the *marcato* theme's dotted-rhythm figure, thus suggesting a transformed reminiscence of its 'parent'
- *contoural shape*- the third, fourth and fifth notes of the *grazioso* variant, a descending major third followed by a descending fifth (bar 39) is almost echoed by the first three notes of the anticipatory variant, a descending major third and tritone (bar 43); when these motives appear together again, in bars 194-199, the association is even more closely imitative, due to the more immediate temporal proximity of the entries, and to the minor modifications in both (Example 3.40)
- *interval*- a rising minor sixth appears in the anticipatory variant (bar 45, violin 1, and bars 47-48, violin 2), the *ritornello* (bar 49, violin 1) and at the start of the Episode that follows (bars 49-51, in all instruments); more comprehensively, a falling major third, already identified as a basic intervallic cell in the *ritornello*, the *marcato* theme and its two variants (Example 3.10c), returns as part of a process of interval expansion in bars 104-115, i.e. from rising minor thirds (lyrical theme, bars 104-110), *via* rising major thirds (violin 1, bars 110-113), to rising fourths (fourth-plus-semitones figure, bars 111-115)

Bars 151-182 (the start of the Recapitulation) contain a sequence of events which is then *reversed* in bars 214-232 (the final 19 bars):

- *ritornello* (151) > *stentato* figure D (165) > descending semitones towards the final note of the 'head' motive (167-169) > wedge movement to the signature harmonies (171-175) > *marcato* theme (181) *BECOMES*
- *marcato* theme (214) > signature harmonies (217-226, but with the *ritornello* intervening) > 'head' motive (227) > *ascending* semitones towards the *stentato* figure D (228-230) > *ritornello*'s first three notes, Ab-G-F# (in the cluster chord at the end of bar 232)

Three axial 'modulations' are relevant to the movement's shifts in pitch focus:

- A strong sum 8 bias in bars 1-3, evident both in the wedge formations and in the frequent PI-dyads,⁹⁰ cedes to the sum 4 wedge at the end of bar 3, and to its central axis, D, of bar 4- Example 3.41; the sum 8 wedge and PI-dyad emphasis soon returns, however, in the *marcato* theme of bars 5-7⁹¹
- The signature harmonies' sum 3/7/11 wedge-movements of bars 34-38 (violins) shift to dual sum 4/0 axes in bars 38-39 (violins and cello) and crystallise finally onto a less equivocal sum 8 inversional movement in bar 40 (viola and first violin⁹²), through the expedient of a temporal note-reversal (C-C# becomes Db-C)
- The transfer from sum 6 wedges to a sum 4 inversional symmetry around D in bars 63-64 happens through the dual role of F and B- Example 3.25c

⁹⁰Archibald suggests an elaboration of this, incorporating a sum 0 wedge to C running concurrently with the other axes of symmetry, op. cit., pages 99-101.

⁹¹Since the *marcato* theme has sum 2 wedge-movement onto G *and* sum 8 PI-dyads, Perle's suggested 'reinterpretation' of the bars 68-71 French sixth tetrachord (4-25) from sum 8 PI-dyads (i.e. F#-D and C-Ab) to sum 2 PI-dyads (i.e. F#-Ab and C-D) has already been revealed in bars 5-7: 'Berg's Master Array of the Interval Cycles', op. cit., page 8.

⁹²Sum 8 then continues to have some sway during the next few bars, in the wedge movement of viola and cello in bars 42-43, and in the PI-dyads G-C# and C-Ab in the first violin, bars 44-45 (see Example 3.26c).

2. The Whole-tone system as a basis for the first movement

Although linear presentations of whole-tone configurations have been found to be an important melodic feature in the first movement (notably in the the '*head*' motive and the *a2* section from the first subject group, and within each of the second subject motives/themes), it is the composer's *vertical* use of whole-tone material which is the more vital structural force. This is because the vertical whole-tone dimension can interact with the linear *non*-whole-tone; more specifically, a vertical interval profile of tones, major thirds, tritones, etc. (ics 2, 4, 6, 8, 10) can act in conjunction with melodic semitones, minor thirds, perfect fourths, etc. (ics 1, 3, 5, 7, 9, 11), as the harmonies change from one whole-tone collection to the other. This kind of whole-tone shift has already been shown, but it can now be noted that in each case the shifts are facilitated by the linear material's predominantly 'odd-numbered' intervals: by accident or design, Berg is exploiting

- the C#-F# fifth of *a2*, in bars 8-9 and 39-40 (Example 3.15)
- the semitone-minor third make-up of *a3*, in bars 17-25 and 119-122
- *all* of the intervals of *b1*, in bars 43-47 and 110-111
- the 'upbeat' rising fifth of *b2*, in bars 47, 62-70 and 165-168
- the fourths and semitones of *b3*, in bar 100
- the semitone and major seventh of *b4*, in bars 58-60 and 159

Using this symbiotic procedure, Berg has created a full vertical/horizontal mix of intervals, providing a means by which a fully chromatic 'atonal' aggregate of pcs can be cemented.

This system, combining vertical 'even-numbered' intervals and horizontal 'odd-numbered' intervals, can be represented in a tabular formulation (Table 3.1) which reproduces alternate rows from Berg's later (1920) all-inclusive 'master array of the interval cycles'.⁹³

Two further factors help to facilitate the explication of a whole-tone basis for the pitch organisation of this first movement. Firstly, there is evidence that some, at least, of the semitonal movement of parts evolves from whole-tone origins. This can be seen in bars 50-51, for instance, where the repetition of *b2* in the upper three parts involves a 'filling in' of

⁹³Described and reproduced in G. Perle, 'Berg's Master Array of the Interval Cycles', op. cit., pages 2-3 and 5.

some of the whole tones with semitones; further instances of such a procedure occur in the passage from bar 64 to bar 72, and in bars 129-131 and 165-168 (again, as an elaboration of *b2*). Most of these newly-created semitonal scales (from whole-tone origins) are the very ones which interact with the alternating whole-tone harmonies described above. It must be noted, however, that there is a general trend towards specifically *descending* semitonal scales during the course of the movement: whereas *b4* is originally presented in such a way as to contain a scale which cycles a semitone-semitone-tone pattern of intervals (i.e. the E-Eb-D-C-B-Bb-Ab-G-F# in the viola, bars 58-62, forming pc set 9-12), in bars 78-79 and 96-99 *b4*'s whole tone step has now become a semitone, in order for the motive to be assimilated into the prevailing semitonal scales.⁹⁴

The second factor is a more specific but particularly telling example of whole-tone influence as a structural force: at the start of the Recapitulation the descending viola semitones and cello fourths become displaced (in bar 106), causing the vertical intervals between them to become whole-tone-based (rather than the previous non-whole-tone);⁹⁵ the following two presentations of these interval-1 and interval-5 cycles (in bars 108-109) retain the whole-tone harmonies, and lead effortlessly into the similarly-orientated *b1* of bars 110-111, thus creating a new association between motives *a1* and *b2* based on the alternation of whole-tone harmonies (because both motives employ 'odd-numbered' intervals);⁹⁶ this passage also initiates the Recapitulation's tendency to blur the presentation of first and second subject material.

Berg's use of notes from the two whole-tone collections, and the shift between them, can even be applied to the sonata structure itself. Whereas *a1*'s '*head*' motive and *a2* are initially stated (in bars 1-2 and 7-8) using notes from the C#-Eb-F-G-A-B collection (with *a2* staying invariant throughout the movement), the second subject-based descending

⁹⁴*b4* returns to its original descending interval pattern at its final appearance, in bars 177-179.

⁹⁵Noted by Headlam, op. cit., page 77.

⁹⁶Their previous association was through both being underpinned by a cello/viola seventh, i.e. G-F# in bars 3-4 and Eb-D in bars 42-44: they now share the G-F# seventh.

scales in both the Exposition and the Recapitulation generally use notes from the contrasting C-D-E-F[#]-Ab-Bb collection,⁹⁷ i.e.

- Bb etc. in violin 1 and F[#] etc. in violin 2, bars 48-49 (and again in bars 50-51)- all *b2* (the outer notes of the G[#]-A-Bb 'counter' motive go the other way)
- E etc. in viola, bars 58-60- *b4*
- C etc., then E etc., then G[#] etc. in violin 1, bars 64-70- all *b2*
- Bb etc. in violin 1 and F[#] etc. in cello, bars 73-74 (cf. bars 48-51)- *b2*
- Bb etc. in violin 2, bars 75-76 (prolonged to bar 80)- *b2*
- Bb etc. in cello, bars 76-80 (all six notes of the scale)- *b4*
- Bb etc. in violin 2, bars 147-148- *b3/b2*
- Bb etc. in viola and F[#] etc. in violin 1, bars 149-150 (as per the association of bars 48-51 and 73-74)- *b2*
- Bb etc. in cello and F[#] etc. in viola, bars 151-152 (ditto)- *b2*

Clearly, the Bb and Bb-with-F[#] scales represent a further instance of invariance in this movement.

If the whole-tone scale used in the '*head*' motive and *a2* (i.e. C[#]-D[#]-etc.) establishes a 'tonic', and the alternative 'second subject' whole-tone scale (C-D-etc.) represents a 'dominant' orientation substituting for a dominant key, then the latter's use during bars 1-9 resembles the tonal use of a secondary/dominant chord or area, such that the bar 5 instance stands for the V part of a I-V-I progression in bars 1-6/7, and the bars 8-9 shift corresponds to a I-V half-close- Example 3.15.⁹⁸ The later shift from the first violin's I 'key' (C[#]-D[#]-etc. scale) in bars 25-31 to the V 'key' (C-D-etc. scale) in bars 32-35 receives such a strong signal at the climax on the barline between bars 31 and 32 that it might (in this sonata-form whole-tone 'keys' scheme) be taken to be furnishing a 'dominant preparation' for the second subject to come.⁹⁹

⁹⁷Only in bars 29-31, and in bars 81-87 of the Development, do whole-tone scales occur in both ascending and descending form, using both whole-tone collections at the same time- see Example 3.39.

⁹⁸Headlam notes the alternating whole-tone areas in bars 5-9, op. cit., page 83.

⁹⁹It may be significant that an initial orientation towards the tritone F-B (in bars 1-2) and G-C[#] (in cello, viola and first violin in bars 6-8, with G then prominent in the cello as a bass 'tonic' during much of bars 3-14) is here replaced by a contrasting tritone (in whole-tone terms) C-F[#] (violin 1's '*head*' motive, with F[#] held in bar

Two features are significant here.

Firstly, the simultaneous scalar rush of sextuplets in all four instruments on the second half of bar 31 is clearly both a culmination for the *a3* passage which started in bar 10 and a signal for change.¹⁰⁰ Each instrument's phrase represents a culmination-

- *violin 1* plays the highest of a rising sequence of '*head*' motive presentations, but a minor third higher (i.e. at a T-3 transposition instead of a continuation of the previous series of T-2 ones), thus anticipating the barline harmonic shift and resulting in the instrument reaching a V (C-D-etc. scale) note at the start of bar 32
- *violin 2* plays a hexatonic scale, the natural outcome of combined and dovetailed *a3* cells, and of this instrument's three-note phrases of the past few bars
- the *viola* plays an upward phrase which contains a three-note semitone-to-tone segment which repeats (like violin 2) the instrument's pattern of the previous few bars, followed by a semitone-to-semitone segment which by design happens to be an anticipation of the V (C-D-etc. scale) G#-A-Bb motive from *b2*
- the *cello* plays a descending semitonal scale, falling to a V-scale C (the C being also the culmination of a whole-tone descent starting from the G# of bar 29)

Secondly, the climax precipitates a canonic sequence of '*head*' motives in all four instruments (violin 1-violin 2-violin 3-cello, in bars 31-33), each using the V (C-D-etc. scale) whole-tone collection; at the same time, violin 1 in bars 31-37 completes its '*head*' motive by presenting *a1*, complete with wedge formation (in augmentation), at a (V-scale) T-7 transposition of the bars 1-6 original, while the cello's contribution is also a complete *a1*, at a (likewise V-scale) T-5 transposition. Given this 'dominant' preparation, these remaining bars of the first subject (bars 32-40) represent a i-v-i full-close in the new, second subject 'key' (i.e. with the bars 33-35 and bar 40 V (C-D-etc. scale) whole-tone areas as the new 'tonic', and the bars 36-39 contrasting I (C#-D#-etc. scale) whole-tone area as the new 'dominant').

32 and C emphasised at the double-octave in the cello).

¹⁰⁰This present reading of the bars 31-32 climax need not invalidate the 'G minor' and hexatonic interpretations postulated earlier.

For this quasi-traditional interpretation to be sustained, one might expect second subject material in the Recapitulation to be presented using the I (B-C#-etc. scale) whole-tone scale. Instead, Berg retains (as he does elsewhere, e.g. in the *Altenberglieder*¹⁰¹) each motive's characteristic transpositional level. The ending is, as often with this composer (c.f., again, the *Altenberglieder*), equivocal: the opening bars 1-3 sequence is repeated, at bars 184-187, in a higher *tessitura*, but with the addition of a further interval cycle segment sounding alongside the interval-1 and interval-5 descents, i.e. the descending whole-tones F-Eb-Db in viola, bar 185.¹⁰² This coming of the full circle is, again, a characteristic formal device in Berg:¹⁰³ the phrase both nullifies and opens up the discourse to further (unrevealed) possibilities.¹⁰⁴

3. Focal centres in the second movement: a D/G dichotomy

The case for *D* as a focal centre has already largely been made; to summarise:

- most occurrences of the *stentato* figure are on D
- the lyrical theme starts with F#-E-D
- C# and Eb 'satellites' pull towards D
- insistent repetitions of A-B-C#-D in bars 216-220 suggest a V-I progression in D
- some progressions suggest D as a resolution, especially the vii9-I of bars 230-232, which suggests a V9 (with tonic pedal)-I in D minor
- Ab/G#, D's tritone/inversional symmetry partner, is prominent at the start of the Recapitulation, bars 150-151

Additionally, the sum 8 PI-dyadic progression G-C# to F#-D in the *marcato* theme, bar 6, suggests V-I in D (a low D is also the concluding note of the widening wedge, at bar 8).

¹⁰¹And in later works, where P-0 forms of series are often retained.

¹⁰²Schmalfeldt points out, in 'Berg's Path to Atonality', op. cit., pages 93-94, that the concluding bars' pc 4-16 sonority (i.e. the original G-F#-B with the addition of the viola's Db) 'quotes' the opening of Opus 1, and reappears in Opus 5 and in *Wozzeck* as well.

¹⁰³See R. Morgan, op. cit., pages 136-145.

¹⁰⁴There is a similarity here, too, to the cyclic nature of the repeat-device used in the Piano Sonata's Exposition- see J. Schmalfeldt, *ibid.*, page 109.

The case for \underline{G} runs as follows:¹⁰⁵

- the *stentato* figure at the start of the Development is on G
- the anticipatory variant starts with a G (bar 2) and returns to G on its sixth note (on the second beat of bar 3)
- the first bar of the *marcato* theme centres inversionally onto the G at the start of the next bar (bar 6)
- the *marcato* theme's D-E-F#-G suggests a V-I progression in G
- frequent occurrences of the descending G-C# intervallic cell, particularly in the Recapitulation, reinforce G as a centre
- the downward inflection Ab-G (deriving from the start of the *ritornello*) is common in bars 45-72¹⁰⁶
- the movement end with a G-based cluster chord; elements of a sum 2 wedge to G (with double-octave displacements) can be extracted from the final bar- Example 3.42
- C#, G's tritone/inversional symmetry partner, is prominent from the third bar of the Recapitulation (bar 153) until bar 172

Additionally, the sum 8 PI-dyadic progression D-F# to G in the *marcato* theme (bars 5-6, 23-24 and 33-34) suggests V-I in G (supported by the C#/Db-G tritone in bars 24 and 34-36).

Clearly, the major third D-F# and the tritone C#-G¹⁰⁷ from the sum 8 PI-dyad collection have a part to play in many of these D-based and G-based configurations. Yet, E and Bb, the expected foci for sum 8 symmetries, do not actually figure strongly at all, apart from the final note, E, of the cello/violin 2 wedge in bars 1-2 and of the *ritornello* wedge of bars 2-3; rather, Berg's *actual* foci (D and G) are sited asymmetrically on the sum 8 axis, with

¹⁰⁵Headlam makes a claim for a focal G in the *first* movement (op. cit., page 77), based on the 'vaguely tonal' pull of the cello's G in bars 3-9, 12, 14 and 20 (ibid., page 83), and, presumably, in the parallel passage around the start of the Recapitulation, bars 101-110, and at the end of the movement, bars 183-187 (ibid., page 86).

¹⁰⁶Eb-D supercedes Ab-G in bars 217-232.

¹⁰⁷c.f. Adorno's comment regarding the fourth Opus 2 song, that 'dominant and leading-tone tendencies still predominate': op. cit., page 49.

the result that he can take advantage of the *tonal* implications of the major third (D-F#) and tritone (C#-G) parts of the mirrored chromatic lines. The pc set so produced by this pair of dyads, 4-8, can also be formed by putting the tritone G-C# together with the *other* sum 8 major third, Ab-C (they appear together in bar 45); these six pcs account for three of the four 'satellite' notes identified earlier, as well as the two central pcs themselves, i.e. F#-G-Ab and C#-D (although not Eb).

While the major third PI-dyads D-F# and C-Ab (which form the pc set 4-25 of the *marcato* theme and of the bars 68-71 transition to the Development) belong to one whole-tone collection, the tritone PI-dyad C#-G belongs to the other; the observable semitonal shifts between 'satellite' notes and focal notes therefore relate to the sum 8 symmetries,¹⁰⁸ but they also inform at least some of the shifts between whole-tone groups described earlier.

If those passages with a tendency towards D or G as focal centres (bars 1-34, 64-72, 150-191 and 214-232) are examined, comparing the frequency of occurrence of each centre within each section, an initial balanced dichotomy seems evident (i.e. in the Exposition), made palpable by the apparent V-I (and other) progressions onto both centres (because each is the 'dominant' or 'subdominant' of the other), and reflecting the Exposition's frequent flux between the two whole-tone collections. Although focal Ds are more emphatic and longer lasting than focal Gs, the preparatory focusing *onto* D is always shorter and less expected (i.e. in bars 3, 22 and 63-64).

Focal centring on D and G seems subsequently to be held in abeyance during the Development section,¹⁰⁹ but right from the outset of the Recapitulation a conflict develops between the two centres (because they are members of different whole-tone collections), evident in the overlaying of whole-tone areas in bars 154-170¹¹⁰ and in the ambiguous role of C# as both whole-tone partner to G and 'satellite' to D. The persistent C# (G's tritone

¹⁰⁸There is a parallel here with the sum 10 'resolution' from D-Ab to Eb-G in bar 35 of the first of the *Altenberglieder*: c.f. Chapter 4, Part C.2, Example 4.30.

¹⁰⁹Apart from some special emphasis on D during bars 91-99, in cello and violins.

¹¹⁰See Example 3.35.

partner) at first 'clashes' with a pedal C (bars 154-159); then, the triplet figure D, previously so forceful, fails to shift the C# (in bars 164-172); when the *Grundgestalt*'s 'head' motive joins the C# (now low on the cello), in bars 168-169, the *stentato* figure D emerges more clearly as an interloper within an opposing whole-tone environment; meanwhile, the *Grundgestalt*'s descending semitones/fourths figure, in bars 169-170, re-admits the low C#-G tritone into the equation, signalling a return to the associated signature harmonies, bar 175.

The idea of a group of notes predominantly from one whole-tone collection, but with one note present from the opposing collection, has engaged several observers of repertory similar to the music under discussion.¹¹¹ There must inevitably be many distinct functions involved in such 'whole-tone-plus-foreign-note' practice: the 'foreign' note may act as a pedal note against which whole-tone harmonies shift, or as a 'dissonant' note which 'resolves', as is the case with the cello F# in bar 6 of the first movement,¹¹² or may have a 'passing note' status, as is the case with the C in the first movement 'head' motive;¹¹³ in other situations the 'whole-tone-plus-foreign-note' status of a particular grouping may be more ambiguous and open to varied interpretation.

The epitome of a formalised 'whole-tone-plus-foreign-note' usage in this movement becomes manifest in the chromatically-shifting signature harmonies (initially in bars 34-39, violins, but again, now, in bars 175-178), where the upper 'voice' acts 'dissonantly' against the lower three (augmented triad) ones. What becomes increasingly the case in the Recapitulation is a move towards a normalisation of this practice, evinced first in the C# against C etc. vertical oppositions of bars 154-167 and in the D against 'head' motive opposition¹¹⁴ of bars 168-169,¹¹⁵ made yet more tangible with the return of the signature

¹¹¹e.g. George Perle in *Serial Composition and Atonality*, op. cit., pages 38f.; Jarman also observes Berg's use of whole-tone-plus harmonies in *Wozzeck* and the *Lyric Suite* (*The Music of Alban Berg*, op. cit., pages 20-21 and page 57).

¹¹²c.f. G. Perle, op. cit., page 6.

¹¹³c.f. B. Archibald, op. cit., page 97.

¹¹⁴D has been associated with the *Grundgestalt* once before, at the start of the first movement's Recapitulation, in bar 105.

¹¹⁵At the return of the 'head' motive in bars 227-228, its whole-tone emphasis is completed by the cello's G.

harmonies of bars 175-178, and formalised still further during the march-like passage of bar 179, where the start of each bar as far as bar 186 has a 'whole-tone-plus-foreign-note' harmony, generally featuring a prominent G in the underlying signature-derived chromatically-shifting harmonies- Example 3.43.

Concurrent with this situation, a merging of identity between the *marcato* theme (bar 181, 1st violin) and its anticipatory variant (bar 185, viola) becomes more palpable through their common transpositional level, since both now start on D. When the theme finally arrives starting on a G, in bar 214, it is not the expected anticipatory variant but the *marcato* theme itself; although it *starts* on G, the *marcato* theme's rising-scale segment, now a reiterated A-B-C#, inevitably leads (V-I-like) onto a seemingly all-powerful D at the start of the Coda (bar 217), a centricity which is emphatically confirmed by the reiterated A-B-C#-D of bars 217-220 and by the D minor cadence of the last three bars.

But this is not the whole story. After the march-like passage's bars 183-186 (Example 3.43), featuring G itself as the rogue 'foreign note', and after further 'Transition' passages, where alternating 'pure' whole-tone blocks are again operating (bars 190-193, 195-196, 198-200 and 203), the 'foreign-note' situation becomes normative at the start of bars 205, 207, 209 and 210, and again in bars 214-217: in three of these latter bars the 'foreign note' is yet again G, *including bar 217*, the start of the Coda; it is precisely here¹¹⁶ that the most emphatic *and* strongly-prepared D of the whole movement is contrarily undermined by the return of the G-C# tritone and the associated ambiguous (in whole-tone terms) signature harmonies.¹¹⁷ A further ambiguity (in focal terms) occurs during the final *ritornello*: starting so confidently with Eb-D in its new T-7 guise, it has nevertheless deliberately been intervallically altered by Berg in order ultimately to descend (by now at T-5) onto an *fff* G at bar 226, mimicking the similar descent to G in bars 216-217: what has normally been an

¹¹⁶A 'foreign note' whole-tone chord with dissenting G occurs at the start of the next bar, too (bar 218); note that the viola part in this bar contains a misprint: the F natural should be F#, confirmed in the Quartet manuscript (ÖNB Musiksammlung F 21 Berg 8, page 33') and in the viola part (ÖNB Musiksammlung F 21 Berg 140), but not corrected by Berg during his proof-reading of the score for publication (ÖNB Musiksammlung F 21 Berg 148).

¹¹⁷There is a pc set correspondence between the chord at the start of bar 217 and the signature harmonies that follow: each contains pc set 4-19.

Ab-G to Eb-D progression in the T-0 versions of the *ritornello* has now become one of Eb-D to Ab-G. At the start of the final bar the unequivocal D tonality (a V9 in D minor, and about to resolve onto the D minor triad on the third quaver beat of the bar) nevertheless *still* emulates the earlier situation of a whole-tone group (now E-Bb-D) being underpinned by a 'foreign note' (again G, plus the C#) from the other whole-tone group, a situation which is reiterated with the final semiquaver 'cluster' chord, *another* 'foreign note' whole-tone harmony with dissenting (but focal) G.¹¹⁸ Thus, this movement, like the first, has an equivocal ending: G remains D's 'alter-pitch centre' to the last.¹¹⁹

¹¹⁸Headlam provides evidence (from a privately-owned autograph) to suggest that the cello E natural is a misprint for E#, so that the cluster should be a completely semitonal one (op. cit., page 412, note 49). Some doubt might be expressed here, because Berg's sharps and naturals are occasionally indistinguishable (this particular note, if an E, needs a natural because the cello has an Eb two notes earlier). Another source, the Quartet manuscript (ÖNB Musiksammlung F 21 Berg 8, page 34') has what appears to be an F natural as the cello's final note, seeming to confirm Headlam's E#. Again, there is a degree of uncertainty because Berg's notes are sometimes misplaced by as much as a tone/semitone. All other sources in the Musiksammlung, including the printed cello part and Berg's annotated printed score for the publisher, have E natural.

¹¹⁹Headlam, for his own (cyclic) reasons, calls the D minor emphasis at the end of the movement 'an illusion' (op. cit., page 61).

Chapter 4

The Five Orchestral Songs to picture postcard texts of Peter Altenberg, Opus 4 (The *Altenberglieder*), their transformation of motives, and their manipulation of symmetrical systems

In common with the Opus 3 Quartet, much of the pitch organisation in these five orchestral songs results from a reciprocal balance between referential and normative procedures. On the one hand, Berg's simultaneous and juxtaposed use of motives establishes interval associations, allows certain pitches to be emphasised, and brings reflexive coherence and ultimately an arch-like recapitulatory balance to each song and to the cycle as a whole. Concurrently, Berg is employing familiar normative forms of note arrangement, such as the division of the octave into symmetrical groupings or interval cycles, and selective aggregates such as the octatonic and whole-tone scales; as in the Quartet, these symmetries and systems occur sporadically and sometimes only briefly, but they nevertheless have an important part to play in defining the work's ever-changing harmonic textures, and in contributing to the shaping of structure in each of the songs.¹

¹There will, nevertheless, be a difference in emphasis: Opus 4 shows less reliance on motivic development and variation, for instance, while its aggregate-system content relies strongly on octatonic structures, and shows a correspondingly lighter reliance than Opus 3 on the whole-tone.

Part A. Reflexive reference and arch forms

1. Motivic associations

The work's principal motives have been comprehensively identified and defined by Mark DeVoto;² they are listed here in Example 4.1 under the same names and at their most commonly found transpositional levels. Greek letters represent motives common to more than one song, while Roman numerals refer to motives confined to Song 1. Motives δ , β , α and ϵ are the most widely used thematically. δ first appears as an added thematic layer to the introduction's developing polyphony of ostinati during bars 9-15 of Song 1; it in turn becomes one of the three *passacaglia* ostinati in Song 5. β , already prominent in Songs 1 and 4, becomes another of Song 5's three *passacaglia* ostinati.³ α makes brief appearances in Song 1 (bars 9-13, celesta) and Song 2 (bars 6-7, solo cello), before emerging as Song 5's third *passacaglia* theme. Elements of ϵ are evident, in different guises, in all five songs.⁴ Example 4.2 shows the relationships.⁵

Certain of the motives seem to have individually-associated characteristics, related often to the text against which they are used. Motive ϵ seems to represent the soul, and often appears at points of heightened emotion, e.g.

- at Song 1's vocal ϵ , '*Seele,...*', bars 22-23 (presaged by ϵ 's rhythm in bar 13, in the piano, and followed by this rhythm in bars 24 *et seq.*, in clarinets, etc.)
- at Song 2's '*Siehe Fraue,...*', bars 8-9 (again, preceded by a variant of the rhythm in bars 5-6, and imitated by cellos)
- at '*Hattest nie Sorge...*' in Song 3, bars 9-10 (ϵ in oboe)
- at '*meine Seele*' in Song 4, bars 6-8 (a variant of ϵ in cor anglais)

²Some notes on the Unknown Altenberg Lieder', op. cit.

³Jarman, in *The Music of Alban Berg*, op. cit., page 36, has pointed out a further hidden and slightly reordered appearance of β in Song 2, i.e. the lower violas' Ab-G-Bb-Db-E in bars 4-5.

⁴The Song 3 (oboe) and Song 4 (cor anglais) association is noted by Headlam, page 175.

⁵Headlam observes that the Song 3 oboe version of ϵ is also embedded in the song's opening vocal phrase, i.e. G-F#-F-A-(G#-G)-C# (op. cit., page 142).

- at Song 5's '*Siehe, hier sind keine Menschen,...*', bars 35-38, where ϵ is stated in canon by voice, horn and cellos (presaged by the rhythm in bars 30-35).

Motive β represents perhaps, in its rising shape, the rising of longing and hope, e.g. at its first appearance in Song 1, bars 1-14 (made up from the initial notes of each statement of motive I), at '*Ich habe gewartet,...*' in Song 4, bars 9-14, and at '*Hier löst sich...*' in Song 5, bars 25-30; the associated motive γ represents a corresponding subsidence, i.e. at Song 1, bar 15, and at the conclusion of the final song, bars 50-53. Motive α often appears at moments of quiet emotion, e.g. at Song 2's point of repose in bars 6-7, and at Song 5, bars 25-27. Motive ζ represents oblivion and drift (i.e. Song 5's '*Hier ist Friede*', bars 16-18 and 39-40), while motive δ 's 12-note 'universe' in Songs 1 and 5 is perhaps a horizontal manifestation of the 12-note chord's representation of the infinite in Song 3. There is a poignant admixture of emotions with the joining of motives α , β , δ and ϵ at the start of Song 5.

There are times, too, when orchestral interludes appear to comment on the text. Song 1 has

- bars 1-17: the snowstorm and its subsidence- the working out of motives I, II, III, IV, V, VI,⁶ α , β , γ and δ
- bars 18-21: 'diatonic' calm- these four bars are situated at the very centre of the song, with 17 bars to either side
- bars 27-29: the storm again- motives IV, VII, VIII and IX
- bars 32-38: the storm clears- same motives; anticipation/hope- motive β

Song 2's bars 6-7: the quiet of the forest after rain- motive α and the central pause chord.

Song 3 has

- the twelve-note chord: the universal 'beyond'
- bars 11-15: freedom from care; the pause in bar 11 comes at the song's emotional centre
- bars 17-18: emptiness- tamtam

In Song 4,

- bar 1: again, emptiness- the flute high Bb

⁶DeVoto's motives I and VI are the same, except that I is always stated in quavers and VI in semiquavers.

- bars 6-9: the soul's longing- the cor anglais solo,⁷ a variant of ϵ
- bars 15-18: waiting- violas and clarinets; these bars come at the centre-point of the song

Finally, in Song 5,

- bars 1-15: oblivion ('*Friede*')- motives α , β , δ , ϵ and ζ
- bars 25-26: grief- motive α and the glockenspiel wedge; these two bars at the exact centre-point of the song
- bars 31-35: emotion vented, and subsumed (to nature)- motives α , β and δ , and the A major chord/harp *glissando*
- bars 46-55: melting-away (both snow and life)⁸- motives β - γ - β

Example 4.3 illustrates the more important associative pc subsets within and between motives. Pc set 3-5 (0,1,6), in particular, is a major structural element, present in almost all of the principal motives; it is *the* implicit primary constituent of pc set 4-9 (0,1,6,7), the '*Lulu*' Basic Cell 1',⁹ which is at the heart of motives IV, α , and δ , contributing to a complex of pc set associations between all three. Furthermore, as Example 4.3 demonstrates, these 4-9s link with other tetrachords (primarily 4-8 and 4-16) to provide overlapping pc set 5-7 (0,1,2,6,7) groupings within each motive. In *Song 1*, of course, motives IV, α , and δ are directly connected, since α is derived from IV transformationally (bars 1-9, celesta), while α and δ each contain the 4-9 grouping D-A-Eb-Ab (both motives start at the same point in the music, in bar 9); additionally, as Example 4.1 shows, motives IV and δ contain the dyad-cell Ab-G, which is ultimately significant since it appears in all of the first song's final statements of motives IV, VII, VIII, IX and β (i.e. all of the melodic phrases of bars 33-36).

In *Song 5*, the pattern of simultaneous statements of themes follows a strict arch-form in accordance with a five-bar variations plan, shown in Figure 4.1 (although there is

⁷Marked '*weinerisch*' (tearful) and '*klagen*' (lamenting) in the draft score held at Lincoln College/Bodleian Library, Oxford.

⁸Marked '*Genassel*' (watery?) in the Oxford draft score.

⁹G. Perle, *The Operas of Alban Berg: Volume Two* 'Lulu', op. cit., page 87.

frequently a slight overlap of themes across the dividing bar-lines).¹⁰ Motive δ assumes hierarchical supremacy over the other motives, since it contains significant elements of all the others (except γ). These relationships (of β , α , ϵ and ζ to δ) are shown in Example 4.4: β 's pitches occur in retrograde in δ , but with pitch E cycled to the head of the sequence (n.b. β in retrograde-form actually appears once, in the voice in bar 29, immediately following the centre-point of the song); α is likewise largely contained in retrograde order in δ , and has at its centre the 5-7 grouping which replicates in slightly altered order the same five pitches at the centre of δ (including the 4-9 tetrachord Ab-Eb-D-A); ϵ relates to notes 1, 3, 4, 5, and 10 of δ , with the first four of its pitches suggesting a transposition at the fourth (T-5) of δ 's notes 1, 3, 4 and 5; ζ is an entirely confected motive, since the dyad D-F# which terminates ϵ (e.g. in the oboe, bar 12) is taken up by ζ as its first two notes (trombone, bar 13, violins, bar 14, and then the voice, bar 16), and the three note group C-Db-Cb which constitutes the conclusion of ζ (voice, bars 16-17) anticipates the start of δ (voice, bars 19-20).

2. Cells and invariant pitch groupings

Whilst the work's motives are less evident in the three shorter central songs, there are nevertheless a number of cell-like correspondences there, particularly in the vocal lines. Many of these are shown in Example 4.5. They include pc set 3-3 (0,1,4), in its characteristic shape of semitone held within the major third; this cell frequently appears in one of two extended forms, i.e. pc set 4-17 (0,3,4,7), often arranged as two major thirds overlapping by a semitone, as in Song 2 (Example 4.8), and pc set 4-7 (0,1,4,5), found in the vocal phrases of Songs 2 and 4 (Example 4.5). The 3-5 cell (0,1,6), common as a motivic component (see Example 4.3), appears in the vocal phrases of all three songs. Pc set 3-1 (0,1,2) is frequently found, both as a chromatic segment (in either direction), and in its 'motive II' form of semitone in one direction plus tone in the other. Cells with an invariant-pitch relationship also occur: these correspondences are marked with a dotted

¹⁰Headlam has the same five-bar plan, although he assigns the theme to the first ten bars rather than just five (op. cit., page 136).

line in the example. Of particular significance is the relationship of Song 4's opening vocal phrase (bars 2-7) to motive δ , with invariant groupings Ab-G-F#-F-E and B-C#C (C-Db-B in δ); Jarman has pointed out a further relationship, between the first vocal phrase of Song 2, bars 1-3, and a T-7 transposition of δ^{11} - Example 4.6.

Each of the central songs also displays its own internal, structurally-significant invariant pitch groupings, often supporting an arch-like plan. A prominent recurrent event in *Song 2* is the octave F sounded in the extreme bass, which underpins the moment of instrumental entry in bar 2 and the central chord of bar 7, and becomes the final note of the song in bar 11. Four other temporally-related correspondences can also be seen at either side of the central chord of this song:

- the solo cello figure which immediately precedes the chord in bar 6 (motive α) relates to the voice and celesta immediately after the chord, since they are each formed from fourths-cycle segments and are complementary in pc set terms- Example 4.7 shows how the cello figure's pc set 7-7, containing two overlapping 5-7s, corresponds fairly directly to the voice and celesta 5-7s
- the viola *col legno* and horn *mit dämpfer* figure (bar 5), consisting of rising diminished seventh tetrachords a major third apart, is mirrored in retrograde in the woodwind (bars 8-11)¹²
- the voice's 4-9 figure from bar 2, Eb-Bb-A-E, is repeated as the voice's final four notes in bar 10, while the same 4-9 notes also occur, with the perfect fourth dyads reversed (or alternatively in a tritone transposition) in the voice and cellos, at bars 8-9¹³
- the upper notes of the celesta in bars 8-9 (i.e. D-Db-F) imitate the voice's '*den Wald*' figure from bars 2-3

This latter grouping is but one of a whole series of pc set 3-3 (0,1,4) cells which pervade the texture of the opening five bars, returning to a lesser extent in bars 8-9. The genesis of this cell is shown in Example 4.8: in each case the cell retains its characteristic semitone-

¹¹*The Music of Alban Berg*, op. cit., page 37.

¹²Noted by Headlam, op. cit., page 89.

¹³Noted by Headlam, op. cit., page 91.

within-major-third shape, although using P, I, R and RI forms.¹⁴ Extensions of the cell appear in bars 3-4 in the instrumental parts, marked pc set 4-17 in the example, in rising 4-note figures and using its characteristic shape of two major thirds overlapping by a semitone.¹⁵ The cell is further extended (and verticalised) in the bar 5 viola/horn figure, where the major thirds are vertically sounded, overlapping by a semitone as they rise. The 4-17 cell can also be found embedded within the vocal melisma of the same bar, this time as a rising sequence of minor third-semitone-minor third, i.e. G-Bb-B-D, equivalent to (and clearly derived from) the pcs from the first two major thirds of the viola/horn sequence; this vocal 4-17 provides a further invariant-pitch link between the opening and closing phrases of the song, by duplicating both the Bb-B-G of bar 1 and the B-Bb-D of bars 8-9.¹⁶

The *third song's* arch shape arises from its three sections, the outer of which consist of presentations of the same twelve-note chord (sounding an octave higher the second time), accompanying the same vocal phrase (bars 1-8 and 18-25). There is a direct correspondence between the first chord's systematic note-by-note upward decay in the wind instruments in bars 6-8, and the rebuilding of the chord from the bass upwards in the strings during bars 18-24 (although the latter is effected at a somewhat slower rate): the dissolution of the chord on the one hand and its reconstruction on the other allow it to frame the central section and at the same time produce the required changes of mood between sections. Two elements within the twelve-note chord relate to other musical events: the top three pitches restate a melodic cell, E-F-B, which has previously occurred prominently in the first song (e.g. in motives V and I/VI in bars 1-5, and in the harmonium chord of bars 28-38), while the lowest four pitches, C#-Ab-D-G, form the 4-9 grouping found elsewhere within theme δ and motive α . The central section's abiding recurrent motive is the falling major sixth, which has its origin in the final two notes of the opening section's vocal phrase, A-C, in bars 7-8, and is then presented in various forms right through to bar 12 (see Example 4.9: note that all falling sixths are major excepting the F-A

¹⁴Noted by Headlam, op. cit., page 89.

¹⁵This cell relates back, perhaps, to the falling sequence A-Gb-F-D found in the descending γ figure of Song 1's bar 15 (see Example 4.3).

¹⁶At this same point in the song, the orchestral chords G/B and F/Eb can also be seen to be referring back to bars 1-2, to the voice's notes B, G, F and Eb.

in the oboe which is minor, and that the Eb-Gb in the clarinet is actually a major thirteenth). The falling sixth chords, D-Ab-C to F-Cb-Eb in horns and then violas bars, 9-11, have a particular reflexive relevance since they return as a motive in Song 5 (i.e. in violas and trombones, bars 37-38).

Although Headlam records 'little repetition of musical figures' in the *fourth song*,¹⁷ some associations can be recorded. Arch-related items are confined to invariant note groupings, at the very beginning and end:

- the prominent high Bb to B on solo flute, sounded initially in bars 1-3 and 5-7, returns at bars 30-31
- the sustained four-note chord F#-Eb-C#-F of bars 9-15 recurs as a contiguous component in the voice's final phrase, bars 28-30, in the order F#-F-Eb-Db
- a tendency for phrases to incorporate a falling semitone, often in the form of an *appoggiatura*, e.g. in the voice part in bars 2-6, and then in woodwind and voice from bar 23 to the end

There is also an arch-relation between the rising voice, xylophone and solo viola phrases of bars 10-15, based on the β motive but reaching ever higher each time, corresponding to the heightening emotion of the text (and aided by *crescendi*, shortening note-values and an *accelerando*), and the falling viola, wind and voice phrases of bars 16-32, corresponding to the text's expression of dying hope (this time aided by *decrescendi*, lengthening note-values, and a *ritenuto* accompanying the fading away of parts in the final bars).

Other associations are imitative:

- the cor anglais solo of bars 6-9 imitates, and is imitated by, notes from the vocal line in bars 4-5 and 9-10, all at the transposition of a tritone (T-6)- see Example 4.10
- several two and three-note sequences are reproduced between wind instruments and voice during the final 3/8 section of the song- see Example 4.11, many of them

¹⁷Op. cit., page 128.

incorporating the passage's characteristic falling semitone, lending some degree of cohesion to these otherwise unrelated phrases.

Part B. Normative forms of organisation

1. Interval cycles

The principal instances of interval cycles in the *Altenberglieder* are in the work's motives:

- motive β contains the four minor thirds of a complete interval-3 cycle (i.e. G-Bb-C#-E at its normal transpositional level), while the associated motive γ has the minor thirds F#-A and B-D-F in its make-up
- δ uses part of the interval-1 cycle in its chromatic descent from Ab to E (as does VIII)¹⁸
- α has segments of the interval-5 cycle in its rising sequences of perfect fourths, E-A-D and Bb-Eb-Ab-Db
- two interval-4 cycles are presented in ϵ (its augmented triads with associated descending minor sixths)
- interval-6 cycle elements (i.e. tritones) appear within the pc set 4-9 segments of δ (A-Eb as a contiguous pair, but D and Ab also, to either side), α (the non-contiguous E-Bb, A-Eb, and D-Ab), and IV (D-Ab and G-C#); motives I/VI, V and IX all have the tritone F-B, while the tritones G-C#, Bb-E and B-F are inherently present in the interval-3 cycle content of β and γ
- motive III consists of an expanding-interval cycle, i.e. using ics of increasing size, 1, 2, 3, 4, 5, 6, and 7 (see the inventory of motives given in Example 4.1).¹⁹

The interval-2 cycle, while present as a strong element in motive I, is otherwise conspicuously absent as a motivic component. Instead, whole-tone groupings are used in

¹⁸ δ 's wedge also shows a descent from the initial C to the Ab, and an ascent from the C to Eb/E.

¹⁹Headlam (op. cit., page 136) spots one other, an interval-5 cycle present in motive IV (in its initial state) as alternate notes, i.e. A-D-G-C, as shown in Example 4.1.

all five songs as binding sonorities (as was the case in Opus 3). Typically, harmonies using notes from each of the two opposing whole-tone groups alternate, as in the passage between bars 22 and 24 of the first song (the alternation is also present in the vocal line, see Example 4.12a²⁰), in bars 9-11 in the third song (again, this includes the melodic content of the passage, this time in the oboe, Example 4.12b), and in bars 30-33 and 36-41 of Song 5 (incorporating notes from *passacaglia* themes δ , β and α in the first passage, and from the song's other two main themes, ϵ and ζ , in the second- Examples 4.12c and 4.12d). Such alternating whole-tone collections allow some degree of progression of parts without the parts themselves being exclusively whole-tone, and have already been used by Berg in his Opus 2, No. 2, and in the first movement of Opus 3. Where one whole-tone grouping persists to the exclusion of the other, a degree of repose or neutrality seems to be established, as in bars 5-6 of Song 2, at the point where the music is approaching the pause chord of bar 7, and in Song 4's final extinguishing phrase in the voice (bars 29-32) which consists of a downward whole-tone scale segment F-Eb-Db-Cb-Bbb (followed by a semitone step to Ab), sung very softly as the instruments (flute, trumpet, tympanum, celesta and cellos) fade away to nothing.

2. Wedge formations

Some of the more prominent instances of inversional symmetry occur as wedge formations, where parts usually move chromatically in both directions, and are usually focused on one pitch either at the start or end of the sequence: these patterns are to be found in all five songs. The *first song* has four instances (see Example 4.13a):

- in the 12- note viola theme δ , where lines diverge outwards from its initial note C to A and Eb in bars 9-11 (symmetrical at sum 0 or 11)

²⁰Noted by Headlam, op. cit., page 92. Clearly, with alternating whole-tone harmonies such as these, the full twelve-note aggregate may well be being sounded within a short space of perhaps only two or three bars. Schoenberg had already observed in his '*Harmonielehre*' of 1911 'the tendency to include in the second chord tones that were missing in the first' (Arnold Schoenberg, *Harmonielehre* (1911 and 1922), transl. by Roy E. Carter as *Theory of Harmony* (Berkeley: University of California Press, 1978)); Berg had been fully absorbed by his former teacher's harmonic ideas during 1911, while working on the index for the '*Harmonielehre*'s publication.

- in the β to γ transition at bars 14-15, which has upper and lower notes diverging outwards, ie. E to F and G to F#, with inner parts rising in parallel with the upper (at sum 8 or 11)
- in the bass of bars 17-24, where an extensive instrumental wedge widens from the B-F tritone of bar 16 to the double octave D in bar 24 (at sum 4)²¹
- in the voice part of bars 20-24, whose lines diverge outwards from an initial B to the Fs in bars 23 and 24 (at sum 10).

Songs 2, 3 and 4 have just one wedge formation each:

- in Song 2, where the voice expands outwards from E# (bar 3) to D and A, symmetrical at sum 10 or 11²² (Example 4.13b)
- in Song 3, where the bass instruments fan outwards from a major sixth G-E (bars 11-12) to Eb-G# in bar 16, symmetrical at sum 11²³ (Example 4.13c)
- in Song 4, where a wedge expands outwards in the voice from A (bar 25) to C and F#, symmetrical at sum 6 (Example 4.13d).

The fifth song, like the first, has four wedges, as shown in Example 4.13e:

- the notes of theme δ now separate out a little further, to Eb and Ab (again, symmetrical at sums 0 or 11)
- there is a sum 8 wedge in the glockenspiel at the centre point of the song, bar 26, contracting from C#-G to E
- 'French sixth' dyads in bar 30, F-G (in flutes, clarinets, horns and lower strings, sum 6) and Cb-Db (part of theme δ , sum 0) spread outwards simultaneously in bar 31 to another French sixth pair of dyads, E-Ab (sum 6) and Bb-D (sum 0)²⁴
- an element of simultaneous sum 0/8 expansion appears in bars 39-42, involving theme δ , sum 0 (voice, piano and bassoon),²⁵ and the chords in trombones and lower strings, sum 8, focused around the twin axes Bb and E.

²¹Noted by Headlam, op. cit., page 92.

²²Noted by Headlam, op. cit., page 91; he also records evidence of sum 7 and sum 9 symmetries in some of the underlying diminished-seventh structures, and sum 9 in the 4-17-based vocal melisma of bar 5, page 91.

²³Noted by Headlam, op. cit., page 92.

²⁴The wedge is noted by Headlam, op. cit., page 93, but not the French sixth context.

Considering these wedge patterns overall, a significant correspondence between the sum 11 interpretation of the β to γ progression of Song 1 and the Song 3 wedge can be perceived in so far as each is initiated by the dyad E-G,²⁶ notes which are prominent as terminal pitches in motives β , δ , α and ϵ and the first two notes of motive I/VI (Example 4.1): indeed, this dyad informs the very centre of the song cycle, at either side of the general pause in bar 11 of Song 3; the pitch E becomes a wedge focus itself in Song 5,²⁷ and the two pitches become the outer notes of the work's final chord (with E in the bass). A different dyadic correspondence occurs specifically in Song 1, where the sum 4 PI pair B-F (bars 15-17 and bar 22) and the sum 10 foci F and B (bars 22-24) interrelate; this tritone is already prominent at the start of the song, in motives I and V, and again at the end, in the harmonium motive V chord (Example 4.1), thus lending the song an element of overall structural symmetry.

3. TINVs and aggregate systems

The three symmetrical tetrachords of limited transposition, 4-9, 4-25 and 4-28 have already been mentioned as being significant elements within certain of the work's motives, invariant pitch groupings and symmetrical structures. These sets are structurally related, being the only tetrachords to contain pairs of tritones (a semitone or fourth apart in 4-9, a tone or major third apart in 4-25, and a minor third apart in 4-28)- Example 4.14a. They belong to a distinct generic group of pc sets called 'modes of limited transposition' or 'transpositionally invariant set classes' (dubbed TINV set classes by Cohn²⁸). The full list of TINVs is as follows

- 2-6, the tritone
- 3-12, the augmented triad

²⁵The sum 0 wedge is noted by Headlam, op. cit., page 94.

²⁶Headlam notes the importance of the G-E association, op. cit., pages 93-4.

²⁷E appears several times as a strategic bass note, at Song 1's second climax, bar 29, and at its conclusion, bar 38, at the end of Song 2- the final notes in cellos, and at the end of Song 5. It is also significant as the cello harmonic pedal in Song 4, bars 22-28, and as the upper note of the A major and β chords in bars 35-36 of Song 5.

²⁸'Properties and Generability of Transpositionally Invariant Sets', op. cit.

- 4-9, the *Lulu* Basic Cell 1
- 4-25, the French sixth
- 4-28, the diminished seventh
- 6-7 (0,1,2,6,7,8)
- 6-20 (0,1,4,5,8,9), the 'hexatonic' scale
- 6-30 (0,1,3,6,7,9), the '*Petrouchka*' set
- 6-35, the whole-tone scale
- 8-9, complement to 4-9
- 8-25, complement to 4-25
- 8-28, the 'octatonic' scale, complement to 4-28
- 9-12, complement to 3-12
- 10-6, complement to 2-6
- 12-1, the 12-note aggregate, or complete chromatic scale/cycle-of-fifths.

6-30 is distinct from the other TINVs in that it is not inversionally symmetrical. Whilst pc sets 2-6, 3-12, 4-28, 6-35 and 12-1 are the actual interval-2, 3, 4, 6 and 12 cycles, pc sets 4-9, 4-25, 6-7, 6-20 and 8-28 might be dubbed 'alternating interval' cycles, since they can be generated from two or more overlapping collections of a particular interval cycle, creating a scalic sequence consisting of two alternating intervals, i.e. the octatonic scale (8-28) generated from two 4-28s (alternating semitone and tone), the hexatonic scale (6-20) from two augmented triads (alternating semitone and minor third), 4-9 and 4-25 from two tritones (alternating semitone and perfect fourth in 4-9, and tone and major third in 4-25), and 6-7 from three tritones (alternating two semitones with a major third); 6-30 (also from three tritones) alternates semitone, tone and minor third. Theoretical schemata for the above are shown in Example 4.14b.

Although the octatonic scale is normally described in alternating-semitone-and-tone terms, or as being formed from two diminished seventh (4-28) tetrachords, it has a more potent make-up than this, theoretically, since it can be generated from pairs of each of the other two tetrachordal TINVs as well, combining at a transposition of a minor third/major sixth

(T-3/9) or tritone (T-6) for 4-9 and 4-25, and a transposition of a semitone/major seventh (T-1/11), major third/minor sixth (T-4/8), fifth/fourth (T-7/5) or minor seventh/major second (T-10/2) in the case of 4-28- see Example 4.15a; additionally, the octatonic collection is unique in that it can be generated from eight other like-pairs of tetrachords, but from *no other tetrachord combinations of any kind* except the related (but different) pair, 4-Z15 and 4-Z29-see Example 4.15b.

Elements of octatonic formations are to be found in all five of the *Altenberglieder*. *Song 1*'s instances are largely concealed:

- the Introduction's motive III comprises a complete collection, 8-28, formed from two simultaneous cycles of increasing interval, a minor third apart²⁹ (Example 4.16a)
- chords β (5-31) and γ (5-32) at bars 14-15 are also octatonic, the progression representing a 'transpositional' shift from one collection to another (Example 4.16b)
- the harmonium's chord E-B-F (motive V, pc set 3-5), which punctures the orchestral continuum during bars 29-32, combines vertically with motive X (the pedal D) and the unfolding motive β in the voice to produce another 8-28 grouping (Example 4.16c)

Song 2's 3-3/4-17 cell structures (Example 4.8) ultimately reveal an octatonic basic sub-structure, using all three collections but focusing primarily on the Coll 1 form, in the viola/horn figure of bar 5 and in the figure's retrograde presentation by the woodwind in bars 8-11. Example 4.16d shows these octatonic constructions, and additionally shows how these passages might have been conceived by Berg as 'strings' of dovetailed major thirds and semitones, rising in bars 1-5 and both rising and falling in bars 8-10. In the comprehensiveness of their pitch and interval organisation, these passages come close to emulating the wholesale use of French sixth sequences in the second of the Opus 2 songs.³⁰ As was noted earlier (in Chapter 2, Part A), Perle has described the Opus 2 sequences in terms of an arrayed alignment of descending semitones or descending perfect fifths, with the whole-tone cycle being represented vertically in the French sixth chords, i.e. using the

²⁹Noted by Headlam, op. cit., page 88.

³⁰Described in C.Ayrey, op.cit., and in D. Jarman, 'Alban Berg: The Origins of a Method', op. cit.

interval-1, 2, and 5 cycles.³¹ Headlam makes the similar observation that this Opus 4 song's octatonic structures in bar 5 (horns/ violas) and bars 8-11 (woodwind) present a dual-alignment of a linear cycle (interval-3) and a vertical interval (ic 4); he also records the pc set 3-3 cells, but does not demonstrate the all-pervasiveness of the 4-17 (0347) system during bars 2-5 (as shown in Example 4.8).³² The dual alignment of bars 5 and 8-11 has a further counterpart in Berg's treatment of the interval-4 (vertical) and interval-5/7 cycles in the Circus Music of *Lulu's* Prologue,³³ a further arrayed alignment of two different cycles, interval-1 and interval-2, occurs in bar 6 of this second song, in the trombones.

Two prominent octatonic collections occur in the *third song*. A seven-note group can be seen in the vocal part which accompanies the twelve-note chord, i.e. F-G-G#-Bb-B-C#-D (pc set 7-31, Coll 1)- see Example 4.34b. The second instance involves the falling sixth chords in flutes, horns, violas and piano, bars 9-11 (pc set 6-27): the full eight-note Coll 2 can be arrived at by adding the clarinet's B-D-Eb-Gb-F, the voice's F-A, and oboe's Eb-D and F-A-Ab-C-Eb, in fact all of the notes in these instruments between bars 8 and 11 except the oboe's Db (Example 4.16e).

Octatonic structures in *Song 4* are again concealed, within the melodic phrases of bars 1-7 (flute, voice and cor anglais, Coll 1) and bars 26-32 (clarinet and flute, Coll 2, and flute, Coll 1)- Example 4.16f.³⁴ *Song 5's* octatonic elements arise, during bars 30-33, through the octatonic nature of motives β (all five of its notes), δ (notes 2, 3, 4, 5, 8 and 9) and α (notes 1, 3, 4, 5 and 6), which are all unfolding together at this point, forming a Coll 1 eight-note group- Example 4.16g; further octatonic groupings occur in bars 46-47 and in bar 49 (again, Coll 1, Example 4.16h).

³¹*The Operas of Alban Berg: Volume Two/ 'Lulu'*, op. cit., pages 161-162.

³²Op. cit., page 89.

³³See G. Perle, *ibid.*, pages 143-145; Headlam finds a similar parallel in Schoenberg's *Nacht* from *Pierrot Lunaire*, written immediately before Berg's Opus 4 (op. cit., page 414, note 15).

³⁴The bars 1-7 octatonic sum 9 PI-dyads Bb-B, F-E, Db-Ab and G-D seem to have had a special significance for Berg in certain of his later works, occurring prominently (along with the other sum 9 PI-dyads) in the Lyric Suite (in the P-O presentation of the series) and in *Lulu* (in the alignment of P and I forms of Dr. Schön's series- see G. Perle, *ibid.*, pages 167-169).

Although the twelve-note aggregate, pc set 12-1, can often occur incidentally in atonal contexts, even within short passages of only a bar or so, it can also be created more consciously, for instance where two or more octatonic Colls appear simultaneously, as in the Song 2 passages described above (Example 4.16d), or where several motives are unfolded at once, as at the start of Song 1's Introduction (bar 1 already involves all twelve pitches). There are even instances where Berg would appear to be deliberately organising the twelve pcs into complete and self-contained aggregate collections. Many writers have identified Opus 4's motive/theme δ as representing the first instance historically of an ordered twelve-note theme, and the chord in parts 1 and 3 of Song 3 as being the first use of a twelve-note simultaneity. (In fact, a twelve-note 'theme' occurs in Berg's earlier Opus 3 Quartet first movement, in the cello part of bars 45-47, Example 3.29, ie. a contiguous Eb-Bb-A-D-Ab-G-Gb-F-E-B-C-C#, not unlike theme δ in its pitch sequence and intervallic make-up; and a twelve-note arpeggiated figure, with one pc repetition, occurs in the Quartet's second movement, in bars 52 and 53.)

But other self-contained twelve-note aggregates occur, generally at structurally significant points. The central section of *Song 3* (bars 8-15) consists of a single statement of such an aggregate, the 8-28 collection D-Eb-F-Gb-Ab-A-B-C of bars 8 to 11 (Example 4.16e) being followed by a five-bar passage entirely based on the complementary diminished seventh tetrachord, Bb-Db-E-G: initially, the first dyad of this tetrachord, Bb-Db in trombone, dovetails with the second statement of the falling major sixth chords in violas and oboe (bar 11), followed *rasch!* by the other dyad, E-G in cellos and basses- both of these phrases are again in falling major sixth form (see Examples 4.16e and 4.9); and whilst the lower E-G remains in the bass throughout bars 11 and 12 (cellos, basses, timpani, bassoon and bass clarinet), the Bb-Db dyad becomes inverted to become a minor third (bar 12), where it remains unchanged through to bar 15 (piano, horns, harmonium and second violins); the dyad E-G effectively retains an influence via the widening chromatic wedge through bars 13 and 14, and re-establishes itself as a minor tenth in bar 15 (Example 4.17a).

Song 4's twelve-note aggregate occurs at the transition between the 2/4 and 3/8 time signatures, in bars 20-21, where the trombones' and tuba's 8-note oscillating sonority A[#]-B, E-F, G-A, C-Eb (pc set 8-16) is set against the violas' final four notes, F[#]-C[#]-G[#]-D (the complementary 4-16; Example 4.17b); one other twelve-note aggregate (possibly also intended as such by the composer) occurs at the end of this fourth song, where three contiguous interval-3 cycle collections in the flute melody, ie. C-F[#]-Eb, D-B-F and E-C[#]-G-Bb are 'completed' by the voice's final two notes, Bbb and Ab.

One further 'aggregate system' needs to be considered here, since Berg's Opus 2, 3 and 4 have developed historically from it: that of 'diatonic' melodic and harmonic progression. The interaction between atonal and tonal facets in Berg's music (in both his early and later works) has engaged many commentators, and particular observations have been made on the tonal elements in the *fifth song* of Opus 4, e.g. by Adorno, who states that 'The passacaglia...makes clearer reference to tonality..., as if the specifically expressive element...still demanded recourse to the conceptual vocabulary of tonality',³⁵ and by DeVoto, who mentions 'strong tonal associations'.³⁶ This pitch-organisational reference to tonality is facilitated through the thematic motives (β , δ , α , ϵ and ζ) generally staying at the same transpositional levels, those shown in Example 4.1, creating a basic orbit of pitch relationships. This is most noticeable in the gravitational insistence of the three pitches which act as terminal pcs in the main themes, i.e.

- C (the initial pitch of δ and the final pitch of α)
- E (the initial pitch of both α and ϵ , and the final pitch of both δ and β), and
- G (the initial pitch of β)

Furthermore, these three pitches tend to be associated in the motives with a neighbour note a semitone above, i.e.

- C-Db (upwards in δ and downwards in α)
- E-F (downwards in both δ and ϵ , and upwards in β in bars 29-30), and
- G-Ab (upwards in β and downwards in δ)

³⁵Op. cit., page 67.

³⁶Some Notes on the Unknown "Altenberg Lieder" ', op. cit., page 62.

These pairs continually exert a complex of gravitational tensions both upwards and downwards. They eventually come together as a series of reiterated falling semitones in bars 23-29 -see Example 4.18; the F-E and G-Ab pairs then continue as an important 'motive' (the harmonised first two notes of β) in the following passage, up to bar 33 -see Examples 4.12c and 4.16g.³⁷

Two different interval cycles are combined in bars 7-9 of the *passacaglia*, where rising fourths in the bass (motive α) are sounded against a descending chromatic scale (motive δ), in a way which is reminiscent of those early twentieth-century tonal sequences discussed by DeVoto and Schubert (see also footnote 61 of Chapter 2):³⁸ Example 4.19 gives Berg's similar progression, where 'tonics' on E, A and D are followed by one on Bb, strongly aided by the rising *appoggiatura* E-F on the first beat of bar 10, and leading to an implied 'flat-key' area in bars 10-11. The *passacaglia*'s parallel passage in bars 42-46 settles instead onto a pedal G between bars 45 and 51; the statements of motive γ on trombones in bars 50-53, each starting F-D-B and over the pedal G, even have a 'dominant-seventh' feel to them initially (although they do not resolve 'tonally' on to a C).

One further quasi-diatonic passage can be mentioned here: in bars 16-22 of *Song I*, violins (in bar 16) then flutes and oboes (bars 17-20, plus other instruments in bars 17-18) also suggest a C major (or A minor) tonality by trilling persistently from a C-E harmonic dyad to one on D-F (bars 16-17), then oscillating in slowing note values between the two harmonies (bars 18-20, supported by the A-G pedal in bars 18-19), and then rising further, gradually through Eb-Gb to E-G (bar 21); this collection of dyads ultimately develops into the 7-note, 2-part phrase of bar 22, where the intervening harmonic dyads between the initial C-G (of bar 17 *et seq.*) and the final G-Eb can be seen as auxiliary passing notes; the Eb-Gb in bar 20 and the E-G in bars 21-22 even become colouristic and expressively potent major triads through the addition of the voice's wordless B (B major) and C (C major)- see Example 4.20. This passage's C major/A minor 'tonality' has even been

³⁷These two dyads have already informed the melodic (mainly vocal) material of the first ten bars of *Song 4*- see Example 4.16f, as part of the octatonic tendency in this passage.

³⁸M. DeVoto, 'Alban Berg and Creeping Chromaticism', op. cit., pages 69-70; P. Schubert, op. cit.

presaged right at the start of the song, in the motive I/VI and V 'white-note' content; significantly, the motive I/VI note sequence returns in bars 14-15, in violas and oboes, immediately before the start of the C-E trill.

Other tonal references in Opus 4 are less clearly diatonic, being merely tantalising glimpses of single chords, which 'fade' as quickly as they appear, e.g. the 'dominant minor ninth' pause-chord occupying bar 7 of the second song, which uses, from the bass upwards, the notes F, C, Eb, A and Gb, but which relates 'tonally' only to the remote bass Fs at the start and end of the song, and the A major triad at bar 35 of Song 5, which is preceded (bar 34, beat 3) by an 'atonal' chord, Ab-C-E-G (pc set 4-19), and dissolves into the equally-unrelated vertical- β chord, G-Ab-Bb-C#-E, at the start of bar 36.³⁹

Throughout the song cycle there are, nevertheless, significant passages offering a more sustained intercourse between the various motives and the various 'aggregate systems', whole-tone, octatonic, quartal, twelve-note and, sometimes, diatonic. In order to assess the interface between systems, a classification and categorisation needs to be made, in accordance with criteria of inclusion and exclusivity. Under this precept, the following 'universe' of aggregate systems can be suggested:

- The 6-note Whole-tone scale (pc set 6-35)
- The 7-note Diatonic (Major) scale (pc set 7-35)
- The 8-note Octatonic scale (pc set 8-28)
- The 6-note Hexatonic scale (pc set 6-20)
- The 6-note '6-7' scale (pc set 6-7)
- The universal Twelve-note scale (pc set 12-1).

Of course, in its chromatic form the final of these systems contains all of the other five. A possible 'quartal' (interval-5/7 cycle) system has not been listed, since its subsections of up to seven contiguous notes coincide with the Diatonic (Major), while all of its subsets

³⁹Headlam sees the A major chord in a more positively tonal light, as a V of V in G, leading to a V4/2 on C on the third beat of bar 35 and a Ib on B underpinning the β chord on bar 36 (op. cit., pages 93-4).

belong in the Twelve-note universe; and minor-mode inflections have not been included within the Diatonic (Major) system (henceforth called merely 'Diatonic'), since these would involve too many extra links with the other systems. The first five of these aggregate systems are shown in Venn Diagram 4.1, as networks of inclusion.⁴⁰ It can be seen that each system except the Diatonic has a 6, 7, 8 or 12-note TINV set as its basis, and that all other 3, 4 and 6-note TINVs are contained within these larger TINV sets, i.e. 4-28 and 6-30 in the Octatonic, 3-12 in the Whole-tone and Hexatonic, 4-9 in the Octatonic and '6-7', and 4-25 in the Octatonic, Whole-tone and '6-7'.⁴¹

While the Diatonic and Octatonic systems each have many exclusive pc subsets, the Hexatonic, Whole-tone and '6-7' systems have few; and while the Diatonic and Octatonic systems have many subsets in common,⁴² other intersections are far more selective in membership. Thus,

- 4-17 (0,3,4,7) and its subset 3-3 (0,1,4) are the only sets common and exclusive to the Hexatonic and Octatonic
- 4-20 (0,1,5,8) and its subset 3-4 (0,1,5) are the only sets within and exclusive to the Hexatonic and Diatonic
- 4-21 (0,2,4,6) and its subset 3-6 (0,2,4) are the only exclusive link between the Diatonic and Whole-tone
- 4-9 (0,1,6,7) provides the only exclusive interface between the Octatonic and '6-7' systems
- 3-12 (0,4,8) is the only common set between the Whole-tone and Hexatonic
- 4-8 (0,1,5,6), 4-16 (0,1,5,7) and 4-16's subset 3-9 (0,2,7) are the only exclusive bond between Diatonic and '6-7'

⁴⁰The Hexatonic actually figures little in these Opus 4 songs, but is included because of its distinctive features; likewise the '6-7', which features primarily through the 5-7 constituent parts of motives α , δ and IV, although the hexachord forms a contiguous grouping in motive α .

⁴¹The two-note TINV 2-6, the tritone, would appear in the Diatonic, Octatonic and Whole-tone systems. Pc sets 3-12 and 3-4 have of necessity been included twice in Venn Diagram 4.1, due to the impossibility of creating a three-dimensional 'wrap-around' diagram on the page (as might be envisaged on a cylinder or sphere).

⁴²Including, incidentally, the so-called 'diatonic' major/minor triad, pc-set 3-11 (shared also by the Hexatonic).

Intersections between more than two systems are provided by the lone pc sets

- 3-11 (0,3,7): Diatonic/Hexatonic/Octatonic
- 3-4 (0,1,5): Diatonic/Hexatonic/'6-7'
- 3-5 (0,1,6): Diatonic/Octatonic/'6-7'
- 4-25 (0,2,6,8): Octatonic/Whole-tone/'6-7'
- 3-8 (0,2,6): Diatonic/Whole-tone/Octatonic/'6-7'

There are no shared sets within any of the remaining three, four or five-way intersections.

Venn Diagram 4.2 shows the interface between the *Altenberg* songs' three prevalent systems, the Diatonic, Octatonic and Whole-tone. Self-complementing tetrachords within the Diatonic pc set 8-23 (representing the seven-note major scale, 7-35, plus the raised fourth degree), are shown in Example 4.21, and are marked 'sc' in the diagram; all octatonic tetrachords are self-complementing except 4-Z15 and 4-Z29, which complement each other- these are shown in Example 4.15b. 'All-combinatorial' sets⁴³ are marked 'ac' in the diagram, and TINVs are underlined.

Part C. Structural networks

Certain structural implications can be inferred from these inter-system elements of exclusion and inclusion: a passage with one predominating system (even if sometimes of only one or two bars' duration) can be confirmed through the presence of one or more pc sets exclusive to that system; and any likely 'modulation' between systems, or passages with a duality/plurality of systems, can be supported by the presence of common sets. Yet such interactive descriptions would not sufficiently fulfil Pople's requirement for a more eclectic and non-hierarchical, yet 'cohesive complex of technical ideas', derivable from 'a network of relationships in which some kinds of referential artefact are shown to inherit properties from, or transfer them to, other artefacts or classes of artefacts'.⁴⁴ For this kind of elucidation to be attempted, systems interaction has to be considered alongside other

⁴³After Milton Babbitt; see G. Perle, *Serial Composition and Atonality*, op cit., pages 136-137, and *The Operas of Alban Berg: Volume Two/ 'Lulu'*, op. cit., page 204.

⁴⁴Op. cit., page 398.

pitch-associative criteria such as, in the case of the *Altenberglieder*, motivic, cell, invariant and sum-symmetrical interactions, together with other more traditional forms of linkage and elision. Through such a descriptive network, the structural and expressive meaning of these various formations and transformations might more adequately be outlined or explained. Any notes or figures not forming part of any normative system(s) prevalent at that time might be considered to be 'dissonant' within that normative situation, particularly if these dissonances can be shown to be metrically placed in such a way as to suggest traditional *appoggiaturas* or passing notes;⁴⁵ at the same time, however, the wider context of the structural networks renders these systems reflexively referential, even though as separate components they are precompositional and normative. The complex of tensions between the prevailing constituent 'artefacts' of a passage can ultimately be seen as informing the wider compositional context, affecting elements such as structural axes, directed motion and points of repose, and the composer's development of ideas (and his realisation of the text).

1. Networks of transformation and 'modulation'

The *first song's Introduction* presents the work's longest, most sustained and most complete passage of transformation and 'modulation'. This depiction of the 'image of the soul's snowstorm', as Carner has characterised it,⁴⁶ consists of transpositional and transformational shifts in the continuous and simultaneous presentation of the six motives (I, II, III, IV, V and VI, see Example 4.1) until the music assumes a vertical presentation of motive β in the second half of bar 14;⁴⁷ there is also a modulatory tendency in the inversional symmetries, moving from sums 10/4, via sum 0, to sum 11 or 8 in bars 14-15.

The first four bars, plus the first three semiquavers of bar 5, consist of unchanged repetitions of the various motives. Although the finer harmonic textures of these opening

⁴⁵See G. Perle, *The Operas of Alban Berg: Volume Two/ 'Lulu'*, op. cit., page 163.

⁴⁶Op. cit., page 88.

⁴⁷Headlam's descriptive terms 'cyclic transposition' and 'cyclic transformation' (op. cit., pages 86-88) do not fully account for the many modifications to the cyclic elements of the motives necessary for Berg to effect the transformation of each into β by bar 14.

bars shift continuously, due to the different metrical length of the motives, the basic fabric remains the same: all twelve pcs are present in every bar; indeed, a neat twelve-note aggregate can be extracted if groupings are made from the two pairs of motives which are metrically-congruent, i.e. the '4/8' III with the '2/8' V, linking B-D#-E-F-F# together (pc set 5-5), and the '3/8' IV with the '3/16' II, forming the remaining group of seven notes- G-Ab-A-Bb-C-C#-D (pc set 7-5)- see Example 4.22. Coincidentally, a 'white-note' diatonic tendency is detectable in the predominant motive, I/VI (pc set 5-24), together with motive V (3-5) -played by roughly half of the orchestra-, ameliorated by a whole-tone tendency in the major-third 'shadowed' version of motive I in first violins, i.e. using F-G-A-B-(C)-Db-Eb-(E). Although pc set 3-5 is the most common motivic 'cell' here (see Example 4.3), pc set 3-8 (present as notes 3, 4 and 5 in I/VI) is the more specifically potent transformational link between diatonic, whole-tone and octatonic tendencies (see Venn Diagram 4.2), and as such can act as a catalyst between them. The same-sum axes in these opening bars are of mainly 'potentially symmetrical' (to borrow Jarman's phrase⁴⁸) linear PI-dyads, at sum 4 or 10- see Example 4.23.

From bar 5 onwards, the upwards transposition of motives begins, following this pattern:

- Motive I, using the remaining pitches of motive β as its initial note (i.e. G moving first to Ab, then to Bb, to C# and finally to E), the process starting in bar 6 and finishing (as a truncated motive) in bar 12; one of the Ab statements, in bars 8-9 is modified slightly
- Motive II, using T-1, between bars 5 and 12
- Motive III, using the 'expanding-interval' cycle, between bars 6 and 12
- Motive IV, using T-1, between bars 6 and 14 (but modifying to motive α by bar 9, and modifying its shape further in bars 13-14)
- Motive V, using T-1, between bars 6 and 13 (modifying slightly in bar 10, by changing the two intervals around)
- Motive VI, using T-2, between bars 5 and 12

⁴⁸Alban Berg: *The Origins of a Method*, op. cit., page 274.

The first motivic transposition to occur, that of VI in bar 5 at T-2, is hardly audible, since this statement of the motive uses notes from the same whole-tone collection as before (the original notes from which are still present in I). The striking aural change occurs in bar 6, with T-1 shifts in all the other motives, i.e. in I (to the *other* whole-tone group), II, III, IV and V. Whole-tone blocks seem to become more marked as the motives reach bar 9, at the point where the new motives α and δ are about to enter, and here examples of the 'linking' set 3-8 abound, many of them as an integral part of the many occurrences of 4-21 (0,2,4,6)-these are shown in Example 4.24.

The δ theme, when it arrives, is not entirely new, since notes 1-3 in bars 9-10 are a T-11 transposition of the original motive II, and notes 4-8 in bar 11 are a slight reordering at T-1 of the first five notes of the original motive IV, or an invariant (T-0) version of this motive's notes from statements of IV in bars 6-7 (Example 4.25). δ has dual inversional wedge-like symmetries, sum 0 emanating from the initial note C, and sum 11 expanding outwards from C-B (see Examples 4.13a and e). This theme's notes are better orientated dyadically for sum 0 in its first half and for sum 11 in its second half, and indeed sum 0 symmetries seem to be predicted, in part at least, in I, IV and VI (bars 8-9)- Example 4.26: note the reproduction of PI-dyads between motives, often in the same register, i.e. C#-B in δ and I, Bb-D in δ and IV, A-Eb in δ , IV and VI, and the minor-seventh F-G in I and VI. This last duplication may be one reason for the 'wrong' version of motive I at this point- we might otherwise have expected the first two notes to be A-F# to make the motive 'correct'; another reason for the 'alteration' is that the motive 'needs' Ab in order to comply with the spelling out of β using the initial pitches of I. Motive α , which grows out of IV at bar 9, is also inversional at sum 0 (Example 4.26).

At bar 11, theme δ seems to shift from sum 0 to sum 11. An interval-5 cycle arrangement of each of the two symmetries can perhaps help to illustrate the changed relationships, from a single-note (sum 0) focal point (the first note C) to ic 5/7 (sum 11) dyadic foci (D-A and Eb-Ab, δ 's 4-9 tetrachord)- see Example 4.27. Sum 11 then becomes one of the alternative axes given in Example 4.13a for the β to γ progression in bars 14-15; it might

be said, then, that δ facilitates a modulation from sum 0 to sum 11 between bars 8-9 and bars 14-15.⁴⁹

At bars 12-14 the transposition, transformation and dissolution of motives becomes more precipitous, arriving onto the β chord in bars 13-14:

- I (in piccolo, 1st clarinet and xylophone) retains the dyad E-C# in bars 12-14,⁵⁰ together with a rising sequence D, then D#, then E as the motive's residual tail, although this is not replicated in the first violins, which instead stick with notes from β in bars 13 and 14, nor in the glockenspiel, which instead retains the initial C#-A# from bar 11 and adds B, then C, then C# as the residual third note in bars 12-13
- II (in trumpets) loses its first note in bar 14, leaving the dyad Bb-Ab
- III (in flutes and 2nd violins) settles on G-Bb in bar 12
- IV/ α (in celesta) loses its final note, then alters its shape in bar 13, so that the two groups of rising fourths derived from α can expand from G#-C#-F# to G#-C#-G (bar 14), and from F#-B-E (bar 13), via F-Bb-E to E-Bb-E (bar 14), thus leaving all five notes of β sounding in bar 14's second half; meanwhile, the harp 'echo', having parted company with the celesta as early as bar 8, has independently arrived at a linear statement (nearly) of β in its treble, in bars 13-14: Gb (should be G?)-Ab-Bb-C#-E
- V (the piano chord) reaches G-C#-G# in bar 13; an E is added in bar 14⁵¹
- VI, like I, reduces to pairs of notes by bar 14, Bb-Db in second and third clarinets, and a G#-A# trill in lower first violins
- δ 's G, in bars 13-15, is also a part of the β chord, heightened by the addition of 'espressivo' oboes (bars 12 and 14), cellos (bars 13-14) and trumpet (bar 15)

Many elements of transformation and modulation continue beyond this point, and into the rest of the song. The momentum caused by the Introduction's process of (upward)

⁴⁹The effecting of a sum symmetry modulation in *Lulu*, similarly induced by an event, has been described by Perle, in his *The Operas of Alban Berg: Volume Two* 'Lulu', op. cit., page 178, in a section derived from Douglas Jarman, 'Dr. Schön's Five-Strophe Aria: Some Notes on Tonality and Pitch Association in Berg's "Lulu"', *Perspectives of New Music*, Vol. 8, No. 2 (1970), 23-48.

⁵⁰Notes of β are underlined.

⁵¹The chord progresses to a three-note segment of the γ chord (still in the piano) at the start of bar 15.

transformation spills over into the downward rush of bars 15-16, with its linear multi-octave presentations of γ and interval-1, 2, 3 and 6 cycles (the latter being the tritone B-F), and then continues beyond. The β - γ progression⁵² represents an octatonic 'modulation' from Coll 1 to Coll 2, but also signals a shift back to the 'white-note' (diatonic) area of the opening (γ contains the B-F tritone, too); both β (pc set 5-31) and γ (pc set 5-32) contain the catalytic (octatonic/diatonic) pc set 3-8 as their 2nd, 3rd and 5th notes (from the bass). Concurrently with the β - γ progression, the twelve-note δ sequence of bars 9 to 15 is extended, as a single arch, to embrace motive I in bar 15 (again, 'white-note', with the tritone/3-8 F-B-A intact), plus a Bb-C-G tail in bars 16-18. Such an overt presence of the B-F tritone in bars 15-17 suggests that the sum 4/10 axis is re-establishing itself at this point, and sum 10 seems to be confirmed in the melodic PI-dyad Bb-C in bars 16-17, only to be immediately overridden by sum 4 PI-dyads, C-E (the 'trill' notes) in bars 16-22, and those of the chromatic wedge formation, B-F, Bb-F#, A-G, etc., starting in bar 17. The presence of motive I in bar 15, as part of the extended δ theme, also acts as a transition, through its pc set 3-8, between the octatonic β - γ progression (the F-A-B 3-8 being invariant between γ and I) and the wholly-diatonic bars 18 and 19.⁵³ While most of the piano's chords in bars 15-16 have no obvious rationale,⁵⁴ other than presenting a falling progression in common with much of the rest of bars 15-16, the sum 11 to sum 4 modulation is supported through an initial sequence of alternating Es and Gs (a sum 11 PI-dyad) which can be discerned in bar 15, reflecting the (octatonic) G-E at the conclusion of δ (bars 14-15, also the start of motive I), altering to one of Cs and Es (sum 4 PI-dyads) in bar 16, which match the (diatonic) C-E in other instruments at this point (Example 4.28).

Throughout bars 9 to 18, the extended δ , although a melody in its own right, performs the function of mirroring the climax occurring in the other instruments at bar 15, except that it seems to be intent on pressing on towards a quickly-dissipated climax of its own in bars

⁵²Headlam likens this progression to one in *Wozzeck*, between Act III, Scene 4 and the D minor Interlude (op. cit., page 89).

⁵³Which contain the 'white-note' group C-D-E-F-G-A, pc set 6-32, well-known in *Lulu* for being the initial hexachord of the P-O form of the opera's Basic Series.

⁵⁴The first chord uses notes from γ (as do all other non- δ /I parts at the start of bar 15), i.e. the diatonic/octatonic 3-11 triad F#-D-A.

17-18. The extended δ melody provides a stable (and intensifying) element at a point where the other motives of bars 1-14 are quickly focusing onto the β chord, i.e. at bars 12-14. Most importantly, it mirrors the sum symmetry and systems changes occurring elsewhere, both supporting them and generating them. Looking at bars 9 to 18 as a whole, there is a great richness of emotion and event, and of control of tension and counter tension, in the interaction between this theme and the processes of transformation taking place in the other parts.

The ensuing sense of calm and wonderment in the words '*Seele, wie bist du schöner, tiefer, nach Schneestürmen*' is conveyed initially by the use of the diatonic groupings, and then by alternating whole-tone harmonies formed from multi-layered semitonal wedge-movements. Pc set 3-8, together with its diatonic/whole-tone trichord-partner 3-6 (see Venn Diagram 4.2), plays its part in effecting this further systems 'modulation', from the diatonic bars 18-19 to the whole-tone bars 22-24. While the voice's opening two wordless notes can be linked harmonically with the prevailing flute/violin dyads to form diatonic (pc set 3-11) first-inversion triads Eb(D#)-Gb(F#)-B (bar 20) and E-G-C (bar 21)- see Example 4.20, they can also be linked with the prevailing wedge notes in harp and low winds to form the triads G-A-B (3-6) and F#-Bb-C (3-8), both of which can be interpreted as being diatonic or whole-tone (but from *different* whole-tone collections: in fact, this wedge formation has consisted of 'whole-tone' dyads, alternating the two opposing collections, since its inception at bar 17- see Example 4.13a); the voice part again rises semitonally to C# in bar 22, in parallel with the wedge's upper part, forming 3-8 triads with both the wind instruments/2nd violin G-Eb and the wedge notes F-B, but this time the total harmonic content (in the final three quavers of bar 22) conforms solely to the complete whole-tone collection, 6-35 (see Example 4.12a).

These bars at the same time display a sum symmetry modulation in the two-part flute progression, from its initial sum 4 harmonic PI-dyad C-E, sounded persistently between bars 18 and 22 (and reflecting the sum 4 wedge, which continues through to bar 24), and the phrase's goal, the sum 10 PI-dyad G-Eb in bar 22. The intervening notes in the wind

instruments' final seven-note phrase of bar 22 are, in this context, auxilliary/passing notes linking the two sum axes: Berg is using a favourite device during bars 18 to 22, winding the phrases up bit by bit (as he did the start of δ in the violas in bars 9-11) until finally springing into action in bar 22, giving the final phrase added potency. The immediate effect is to introduce the opening vocal phrase '*Seele, ...*' which, like the G-Eb dyad, displays a sum 10 symmetry about an axial pitch B in its widening wedge of PI-related linear dyads, as shown in Example 4.13a.

But the wind instruments' final G-Eb also has a longer-term modulatory significance. The note G, which DeVoto labels a 'focusing pitch' in motive I/VI at the start of the song (within a sum 4 or 10 context),⁵⁵ becomes prominent as the high point of the extended δ melody (bars 12-14), where its sum 11 PI-'partner' is the note E, and as the ultimate goal of this melody (bar 18), where the sum 4 PI-dyadic partner is A.⁵⁶ Now, in bar 22, and simultaneously with the sum 10 G-Eb in wind instruments, the second violins take over the G's present PI-partner, Eb, and make it a compellingly expressive element until it is eventually 'forced down' to D, in bar 25, as part of the instrumental wedging process which has been operating up to this point; in this respect, the pedal D must be seen to be a tension-inducing 'dominant' to the focal pitch G,⁵⁷ since it has succeeded in unseating the G's sum 10 partner, Eb; the D acts as a controlling and stabilizing element through the next climax (bar 29), and acts as a local focal centre within both a sum 4 and a 10 context at bars 25-26 (Example 4.29; note the quasi-diatonic progression A-C#-D in motive IV, double-basses).⁵⁸

As the pitch G re-establishes itself as a consistently sounded element (starting from bar 29 in the voice) there is as yet no sum symmetrical stability, since the motivic passage which started in bar 25 is still working itself out, although the motive V harmonium chord,

⁵⁵'Berg the Composer of Songs', op. cit., page 54.

⁵⁶G is also the voice's highest note, in bars 25-26, and is then prominent as the reiterated lower note in the voice, then solo violin, in the extended β , in bars 29-34.

⁵⁷Headlam sees the Eb and D-based whole-tone harmonies at bars 23-24 as a #6-V7 progression in G (op. cit., page 92).

⁵⁸Headlam notes the sum 10 context at this point, op. cit., page 131 and 133.

glimpsed (aurally) from bar 28 on, provides a kind of primordial sum 4/10 sonority through its B-F tritone. The point of resolution comes at the barline of bar 35, where the final statement of motive IX occurs in second violins, and the solo violin moves from G to Eb. Whereas motive IX's first appearance (flute and oboes, bar 25) had Eb falling to the newly established pedal D (as did the *fortissimo* 2nd violin Eb), now (in bar 35) the motive has Ab falling to the focal pitch G (and almost concurrently, motive VIII in bars 33-34 and motive IV in bar 35 also have Ab-G); at the same time, the pedal D finally succumbs to the Eb that it had initially suppressed. This sum 10 resolution, Ab to G and D to Eb is shown in Example 4.30.⁵⁹ The solo violin's move from G to Eb provides a necessary element of stability and finality at the close of the song.⁶⁰

2. Networks of dualism and pluralism: simultaneity and overlap

The *first song's* Introduction has been shown to feature a multiplicity of simultaneous aggregate systems (diatonic, whole-tone and octatonic), and a temporally dislocated unfolding of an array of cyclically-transposed motives. A more straightforward dualism in the same song occurs in bars 20-24, where the sum 10 vocal wedge unfolds simultaneously with the sum 4 instrumental wedge in such a way that their PI-dyads change together in accordance with the whole-tone shifts occurring during bars 22-24; the picture is completed by other instrumental parts moving in parallel or in their own even-summed mini-wedges, again complying with the prevailing whole-tone patterns- these are shown in Example 4.31.⁶¹ An example of motivic and cell-like pluralism, involving a number of different interval cycles and aggregate systems, appears at the song's second climax: bars 27-29 simultaneously feature

- motive VIII's augmented triads (horns) rising in whole-tones, then fourths chords (trombones and trumpets) rising in semitones in the brass

⁵⁹Representing, perhaps, the clearing of the storm.

⁶⁰The solo violin's extension of motive β , as it takes over from the voice, can be explained to some extent in sum-modulatory terms: G's sum 11-associate E, from bars 14-15 (bar 32) is followed by its sum 4-associate A, from bar 18 (bars 33-34), and finally its sum 10 resolving Eb, from bar 22 (bar 35).

⁶¹Headam's observation (op. cit., page 92) that bars 20-26 'are completely controlled by the wedge, with no other motives appearing' misses the presence of motive ϵ in the voice.

- a sequence involving the octatonic (5-16) motive IX (rising alternately, in bars 25-29, at transpositions of T-3 and T-1)
- numerous occurrences of pc set/cell 4-9, some within statements of motive IV

The horn chords have a whole-tone basis, while the trombone/trumpet chords have a diatonic basis (each chord an instance of pc set 6-32)- Example 4.32a, the motive IX transpositions have a hexatonic (6-20) basis (matched by the final, *fff*, augmented-triad-based brass chord)- Example 4.32b, and the 4-9s are in both 5-7 ('6-7' system) form, in motive IV, and in octatonic Coll 1 and Coll 2 form- Example 4.32c.

A complex network of simultaneities and overlaps helps to structure bars 5-6 of *Song 2*. The octatonically-based 3-3/4-17 progressions of bars 1-5 (Examples 4.8 and 4.16d) are joined in bar 5 by the whole-tone flute figure G-B moving to F-Eb (pc set 4-24, or 5-33 if considered with the strings/harp pedal C#); the common factor here is the G-B link from the viola/horn figure. Yet the flute Eb equally constitutes a 'dissonance' in an otherwise wholly-octatonic (excepting also the voice's melismatic grace-note, F#) environment: G-Bb-B-D-E-Bb-F in the voice, F-G-B in flutes/trombones, and the pedal C#, forming together C#-D-E-F-G-Bb-B. The dissonant Eb resolves back to the B at a point (bar 6, second quaver) where the ambivalent (as far as the whole-tone and octatonic systems are concerned, see Venn Diagram 4.2) pc set 4-25 is being sounded, i.e. G-B in flutes and trombones, F in the voice, and the pedal C# in harp and violins. This 4-25 grouping was previously sounded octatonically in the viola/horn figure, as its first, third and fifth harmonic dyads, i.e. G-B, Db-F and G-B.

A similar example of whole-tone/octatonic dichotomy occurs in bars 9-11 of *Song 3* (see Examples 4.12b and 4.16e). The pc set 3-8 'falling sixth' chords of bars 9-10, D-Ab-C and F-Cb-Eb, represent, together with the prevailing notes in flutes, oboe and clarinet, a switch from one whole-tone collection to the other, i.e. C-D-Gb-Ab (4-25) to Eb-F-A-Cb (again, 4-25); at the same time the chords present, with the clarinet notes of bars 8-10, the oboe ϵ theme in bars 9-11, the voice F-A and the repeat of the chords in the violas in bars 10-11, the complete octatonic collection Cb-C-D-Eb-F-Gb-Ab-A. In the whole-tone context the

voice F (bar 9) and oboe passing-note Db in bar 10 are 'dissonant' (against the first collection), while in the octatonic context the oboe's Db is again a 'dissonant' passing-note. Since the 'falling sixth' chords constitute a (repeated) motive, these bars offer an example of simultaneous motivic dualism, too, i.e. motive ϵ +'chords'; this motivic association recurs in bars 37-38 of Song 5 (ϵ in cellos, chords in violas, then trombones), but here only the whole-tone element from the systems dualism survives.

One further instance of whole-tone/octatonic interaction occurs during *Song 5*'s second climactic *crescendo* of bars 31-34, influencing the vertical alignment of the simultaneous presentation of the three *passacaglia* themes, α , β and δ . Once again, the common inter-system pc set is 4-25: Example 4.33 shows that β 's first note, G, with its attendant F, sounds against δ 's Db-Cb in bar 30 forming the first (whole-tone) 4-25, from which point both motivic dyads fan out semitonally in the next bar, creating the other (opposing whole-tone) 4-25 from β 's Ab+E and δ 's Bb-D, together with α 's first note E which starts at this point; at the same time, the two 4-25s together form a complete and contiguous octatonic grouping. The second 4-25 returns in bar 33, this time through an alignment of β 's Bb+E, δ 's Ab and α 's D-Bb. As in Song 3, the whole-tone division of the octatonic collection occurs through the replacement of one 4-25 subset by the other, complementary one, although the nature of the whole-tone switch differs, being a (mainly) T-3 transposition in the third song and semitonal wedging in the fifth song. One further completely whole-tone vertical alignment follows in bar 34, incorporating β 's C#, δ 's F and α 's Eb. This passage additionally shows a simultaneous alignment between a system (whole-tone) and a motive (β): each whole-tone block specifically contains a harmonisation of the notes from β , which unfold a sequence of widening interval (boxed round in Example 33), from the tone F-G of bar 30, via the major third E-Ab in bar 31 and the tritone E-Bb in bar 33, to the (other whole-tone collection) augmented sixth pc set 6-35, bounded by Eb and C#, in bar 34; only with the final A major harmonisation of β , δ and α in bar 35 (incorporating β 's and δ 's final notes, both E, and α 's penultimate note, Db) is there a shift from the whole-tone domain.

Song 3 has one further instance of dualism. The twelve-note chord exhibits elements of two separate inversional symmetries embedded within its make-up, at sums 9 and 5. The sum 9 symmetry exists through the presence in the chord of five adjacent PI-dyads from this axis, C[#]-A^b and D-G in the bass (forming pc set 4-9) and E^b-F[#], A-C and E-F (see Example 4.34a);⁶² this axis of symmetry is further supported by the inversionally-spread arrangement of many of the notes in the vocal part which runs simultaneously with the twelve-note chord- see Example 4.34b. The other perspective, of sum 5 symmetry, requires a theoretical segmentation of the chord into two overlapping sub-chords, an eight-note sector consisting of the lowest six notes, C[#]-A^b-D-G-B^b-E^b, plus A and E from the upper part of the chord, inversionally symmetrical around the G and B^b (or an unsounded G[#]/A), and the remaining four notes, F[#]-C-F-B, inversionally symmetrical around the C and F (or D-E^b, as sounded in the clarinet in bars 8-9). This bipartite arrangement of the chord reveals three distinct instances of pc set 4-9 in its make-up (or two 4-20s and a 4-9), shown in Example 4.35. The example also shows a sum 5 extension of the upper 4-9 symmetry in the clarinet's B-D-E^b-G^b which follows the wind version of the twelve-note chord in bars 8-9, and shows a similar sum 5 anticipation of the eight-note (pc set 8-9) symmetry in the G[#]-A from the bar 16 chord which precedes the string version of the twelve-note chord.⁶³

The opening bars of the *fourth song* are open to alternative 'systems' interpretations. Octatonic Coll 1 can account for all of the notes in bars 1-5, except for the voice's (dissonant passing note?) F[#]s, and also for the cor anglais part up to its B^b in bar 9; at the same time a division, based partly on instrumental and partly on metrical lines, into two distinct hexatonic collections can be discerned in bars 1-5, where the group E-F-A^b-D^b in the voice (bars 1-5) contrasts (and is dissonant) with the complementary collection, consisting of the metrically-stressed voice G-F[#] which occurs twice at the start of bars 3 and 5, the flute B^b-B of bars 1-3, and then the vertically sounded voice E^b, cor anglais G-D and flute B^b-B in bars 6-7. The common octatonic/hexatonic link is 4-17 and its subset 3-

⁶²Headlam notes the sum 9 (or 3) 4-9 and 4-28 segments and sum 9 dyad elements of the chord, op. cit., page 92.

⁶³This bar 16 chord is itself a residual consequence of the sum 11 wedge which has been in operation since bar 11- see Example 4.13c.

3,⁶⁴ as Venn Diagram 4.1 shows. Whereas the many instances of the 3-3/4-17 cell in Song 2 ultimately led to an octatonic superset (Example 4.16d), the cells here, i.e. E-F-A \flat -D \flat in the voice and B \flat -B-G-D in flute and cor anglais, conform to both systems. Example 4.36 shows these cells within both arrangements.

3-3 and 4-17 return as a regular feature during the conclusion of this fourth song, from bar 26 onwards, within the context of two octatonic collections, B-C-D-E \flat -F-F \sharp (Coll 2) in clarinet and flute, bars 26-28, and E-F-G-B \flat -B-D \flat (Coll 1) in flute, bars 28-32. The two passages, at the beginning and end of the song, also reveal a realignment of pc set 4-17 and 4-9 dyads, suggesting a transformation of a sum 9 or 3 PI-dyadic arrangement (bars 1-7) into one of sum 5 PI-dyads (bars 27-32), as Example 4.37 shows.

The simultaneous unfolding of motives/themes is the most consistent and fundamental structural feature of the *passacaglia finale*; even the γ - β progression of bars 50-54 is not merely a reversal of the bars 14-15 bar-line progression from β to γ in Song 1, since here there is an element of dualism involved in the transformation, with a simultaneous systematic breaking-down of one motive and the building-up of the other during the course of the five bars. The terminal pitches/gravitational dyads of the *passacaglia*'s main motives, together with the invariant groupings D-F \sharp (ϵ and ζ) and B-B \flat -D (δ and ϵ), can be schematised into two all-embracing 'simultaneous' symmetrical groupings, at sums 8 and 0 (see Example 4.38). These two forms of inversional symmetry do indeed seem to have actual prominence at certain points in this song: in the *passacaglia* themes themselves, where the sum 0 arrangement mirrors the wedge symmetry of the song's generic master-motive, δ (Example 4.4), in the centre-point sum 8 wedge formation of bars 25-26 (glockenspiel), and in the sum 0 F-G to E-A \flat motions of bars 30-32; the two symmetries come together in the semitonal movement of bars 40-42 (Example 4.13e).

⁶⁴The 3-3 cell in Song 4 is noted by Headlam, *op. cit.*, page 175.

3. Networks of elision and linkage

Many of the points of interactive correspondence between motives/themes in the *fifth song* actually occur as points of elision or of sequential repetition- these are shown in Example 4.39. Most notable are:

- the note E, the terminal note of β , which is immediately taken up as the first note of α in bar 7, and which is also the last of β and the first of ϵ in bars 35-36
- the dyad F-E, which forms both the conclusion of δ and the start of ϵ , in bars 10-11
- the dyad D-F#, which terminates ϵ in bar 12 and is immediately taken up in the next bar by the third trombone's ζ
- the three-note group C-Db-Cb which forms the end of ζ and the beginning of δ at bars 16-20; both items are elided at bars 39-40.

In addition to these inter-motivic links, the motives also frequently interconnect with other non-motivic parts. In bar 26, for example, the terminal note E of the glockenspiel wedge figure coincides with the first note of a statement of α in the solo violin; and at the start of bar 35, the terminal notes of the three main *passacaglia* themes converge to form the climactic A major triad, i.e. the Db of α , the E of δ , and the harmonised E (A-C#-E) of β (Example 4.33).

A consistent feature in Berg's earlier music is what DeVoto calls 'creeping chromaticism',⁶⁵ a term used to describe stepwise linear motion, often in semitones, and sometimes in simultaneous voices, in either contrary or similar motion. A specific form of this phenomenon would be the wedge-like formations found in several of these songs (catalogued in Examples 4.13a, b, c, d and e). As important a 'creeping' element in *Song 5*, though, is the descending chromatic scale, present motivically in both δ and ϵ , but which soon emerges as a particularly prominent independent feature of harmonic movement, at first in a continuous sequence of parallel major thirds (bars 16-21, Example 4.40a), then as a series of shorter sequences (bars 22-29 and 36-50), most of which elide with, and provide

⁶⁵'Alban Berg and Creeping Chromaticism', op. cit.

links between, many of the motivic statements, i.e. of β s, δ s and α s in bars 20-29 (Example 4.40a) and of β s, ε , ζ , δ , α and γ in bars 36-50 (Example 4.40b).

Similar links and elisions abound in the *second song*, helping to provide continuity in this most aphoristic of the *Altenberglieder*. They include

- a chromatic descent in the cellos (bars 4-5), which joins the clarinet/harp 4-17 cell's final note E (Example 4.8) to the whole-tone collection's pedal C#
- motive α 's final two notes, Db-C, in bars 6-7, which 'force' the pedal C# down to become the pause chord's C
- the trumpet's major triad B-D#-F# figure in bar 6, which provides a connection between the trombone's 'whole-tone' B and the pause chord's upper note Gb
- the voice's third note of the bars 2-3 pc set 3-3 cell E# (Example 4.8), which serves also as the opening focal pitch of the ensuing wedge sequence in bars 3-4 (Example 4.13b)
- the bassoon/viola octatonic Coll 2 notes Ab and C (bar 4), which fall semitonally to the G-B of the following bar's Coll 1 figure in the same instruments (Example 4.16d)
- the final G-B of the rising octatonic figure in violas/horns (bar 5, beat 2, Example 4.16d), which immediately becomes the opening G-B of the whole-tone figure in flutes, bars 5-6
- motive α 's first note E (bar 6), which acts as a 'leading-note' to the bass-note F which then underpins the pause chord; the same two pitches conclude the song in bar 11
- the A-E-Eb in cellos, bars 8-9, part of the canonic repetition of the vocal line, which connect with the celesta's fourths sequences of the same bars⁶⁶
- a cyclic array in the trombones (bar 6), consisting of the parallel sequences B-Bb-A and G-F-Eb, which connects the whole-tone dyad G-B to the pause chord's Eb and A.

⁶⁶Although the celesta strictly speaking sounds an octave higher.

The equally-concentrated *Song 3* also has several examples of linkage and elision:

- the middle section's first note B in the clarinet, bar 8, which grows out of the highest note of the twelve-note chord (already in the clarinet in bars 6-8, and the last note of the chord left sounding)
- the Db from the middle section's final chord, bar 16 (already present in the pedal dyad Bb-Db since bar 12), which then becomes the twelve-note chord's lowest (and first) note in cellos and celesta, i.e. C#, in bar 18
- the clarinet's Eb, bar 9, which sounds against the oboe's first note, Eb, of motive ϵ
- the oboe's final note Eb of ϵ , bar 11, which has been altered from an expected E, in order that the instrument's C-Eb conforms to the falling major-sixth chords at this point, Examples 4.12b and 4.16e⁶⁷
- the final falling major-sixth chord F-Cb-Eb in violas, bar 11, which is linked to the start of the Bb-Db pedal dyad through the doubling of these chords on piano (remotely-slurred), creating, in the process, a quasi-diatonic (pc set 5-24) V-I progression in Bb minor

Certain song-to-song transitions show the same kind of linkage:

- Song 1's final note E acts as a 'leading note' to Song 2's bass F in bar 2, in the same manner as the E-F in bar 6 and in bar 11 of Song 2
- Song 1's final three melodic notes, E-A-Eb, in the celesta, bar 36, anticipate (or are imitated by) Song 2's Eb-(Bb)-A-E 4-9 figure of bar 2 (in the voice)
- Song 3's string chord top note, high B, becomes sonically translated, at the same high pitch level, into Song 4's flute Bb-B (bars 1-3)
- Song 3's sum 9 PI-dyadic arrangement of the twelve-note string chord links with Song 4's sum 9 PI-dyads in flute, voice and cor anglais (bars 1-7)

The *first song* has a few similar short-term connections, e.g. the mapping of motivically-derived parts onto the β harmony in bar 14, and the dual role of the note G in bar 18 (as

⁶⁷Similarly, the final note of the horn's ϵ in Song 5, bar 38, is F rather than the expected F#, and for the same reason, Example 4.12d.

final note of the extended δ /motive1 melody, and as sum 4 wedge-note, partnering the bass-note A, Example 4.13a). An altogether longer-term link is provided, though, by the wedge itself, since it connects the end (i.e. the note G, bar 18) of the δ /motive 1 melody (which has itself provided the main element of continuity in bars 9-18), and also the F-B tritone of γ (which, through β , is also linked transformationally to the opening 14 bars), to the start of the pedal D in bar 24 (which is in turn the stable element of bars 24-34); these long-term links are schematised in Figure 4.2.

Long-term linkage is of vital structural importance in the *fourth song*, too. After the initial flute, voice and cor anglais solos of bars 1-8, a four-note chord is set up, consisting of the notes F#, Eb, C# and F from the bass upwards, which then continues through to bar 15 (pc set 4-11; the C# originates as the cor anglais solo's final note). This long-term chord is matched by another in the second half of the song, again of four notes, this time using A, Eb, B and E from the bass upwards (pc set 4-16); this chord decays during the final five bars of the song. It is the intervening bars between these two chords (bars 15-21) which provide the passage of long-term linkage. The three clarinets and bass clarinet (which are sustaining the first chord at bars 14-15) descend independently of each other during bars 15-18, in a metrically and rhythmically-ambivalent 'free-fall' from the first chord, until each reaches a point of oscillation between two notes (still metrically ambivalent and rhythmically independent of each other) in bars 18-21, i.e. with Bb-B in the bass clarinet, F-E in the third clarinet, G-A in the second and C-Eb in the first (see Example 4.17b; trombones and tuba take over in bar 20). The pc set 4-16 element of this oscillating pc set 8-16 sonority, B-E-A-Eb from the bass upwards, shown in the example, is then transferred to bar 22: the upper and lower dyads of this chord-within-a-sonority become swapped around at the barline between bars 21 and 22, thus creating the second long-term chord A-Eb-B-E. This realignment and transference completes a long-term (four-part) linkage between the two long-term chords, and thus gives structural continuity to the whole song.

Chapter 5

The Four Pieces for clarinet and piano, Opus 5, and their forms of pitch organisation within an athematic context

This analysis differs somewhat from those provided for Opus 3 and Opus 4, since the music here is constructed primarily through cell structures and much less from motivic and thematic material. Such a compositional approach was extreme for Berg, and exhibits uncharacteristically close ties with the athematic and aphoristic works of Schoenberg and Webern from the same period, although it does have precedents in Berg's own three central *Altenberglieder* and, most appositely, in his first atonal composition, the fourth Opus 2 song, *Warm die Lüfte*, written three years earlier in 1910.

Part A. Reflexive reference

1. The four pieces and their motivic connection

The four pieces, although short (of 12, 9, 18 and 20 bars duration) have commonly been seen to represent the four movements of a sonata in embryo: sonata form *allegro*, slow movement, *scherzo* and *rondo* finale.¹ Adorno has further proposed a tripartite form for each piece,² where

- in the first piece, a 'development' (bars 7-8)³ separates an 'exposition' from a 'reprise' of material

¹See e.g. M. Carner, op. cit., page 109, and George Perle, *The Operas of Alban Berg: Volume One/ 'Wozzeck'* (University of California Press, 1980), page 11.

²Op.cit., pages 69-71.

³The present analysis proposes a slightly larger development section, from bar 6 to the pause in bar 9.

- in the second, a central chord sequence and a clarinet descent of over three octaves (from bar 5 to the second beat of bar 7) separates sections that are underpinned entirely by a reiterated harmonic major third, D-F#
- in the third, a contrasting slower 'trio' section of four bars (bars 9-13: *Langsame Viertel*, 3/4) precedes a reprise of the *scherzo*'s fast tempo and 6/8 metre
- in the fourth, an initial reiterated chord (bars 1-4) returns as a *quasi-rondo ritornello* in bars 11-12; the section between is episodic rather than developmental; the climactic section following at bars 13-16 leads to a quiet *coda* of three bars (18-20)

There is one fundamental element of motivic reference and reprise in these pieces, which ties the opening and closing bars of each. Douglas Jarman has shown how each of pieces 2, 3 and 4 start with a version of the first piece's *initial phrase*:⁴

- all eight pcs of the nine-note *initial phrase* of No.1 (forming pc set 8-Z29, shown in Example 5.1a) appear reordered at T-0 at the start of No. 2 (Example 5.1b⁵)
- the same eight notes appear differently reordered at T-4 at the start of No. 3 (Example 5.1c)
- the first six notes of the phrase (forming pc set 6-Z44, also shown in Example 5.1a) appear at T-0 at the start of No. 4, in the form of the five-note *ritornello* chord plus the destination-note of the clarinet's first three-note phrase (Example 5.1d)

Variants of the *initial phrase* can also be perceived at the conclusion of each piece:

- the first six notes recur as two three-note phrases played simultaneously at T-8 in bar 9 of the first piece's reprise (Example 5.2a)
- all eight notes are regrouped at T-2, at the end of No. 2 (Example 5.2b)
- all eight notes are differently regrouped at T-0, at the end of No. 3 (Example 5.2c)
- the first six notes are again reordered at T-0, at the end of No. 4 (Example 5.2d)

⁴*The Music of Alban Berg*, op. cit., pages 24-25.

⁵The clarinet's Db is unaccounted for.

2. Intervallic cells, motivic cells and larger cell structures

Adorno has implied a cell-based structure by stating that 'the smallest link' binds this work's 'dynamic' and that 'if everything is development then any independently defined material loses its meaning'.⁶ Jarman is more specific in suggesting that almost all of the material in these pieces consists of a manipulation of certain basic 'intervallic cells' which derive from the clarinet's *initial phrase*.⁷ He cites five three-note cells, shown in Example 5.3 (with Jarman's labels I-V) and he suggests the presence of two others (given here the labels VI and VII); since these cells are representative of seven of Forte's twelve three-note Prime Forms,⁸ Example 5.3 can be completed by listing the most obvious instances (in the *initial phrase*) of the other five Prime Forms, here labelled cells VIII-XII (Forte's set names for all twelve cells are shown in parentheses).

A further classificational refinement, of value in assessing the broader range of cell structures in the work as a whole, involves a listing of all recurrent three-note intervallic shape types within each of the twelve cell categories, where differences between subcategories are the consequence of reordering and/or octave displacement, and where equivalences within subcategories embrace transposed, inverted or retrograded versions of each discrete shape. In total, there are 38 distinct three-note (recurrent) cell shapes in Opus 5.

They are:

- Ia (1^2), Ib (1^{11}) and Ic (1-1) [pc set 3-1]
- IIa (5-8), IIb (1-4), IIc (11-5) and IId (1^5) [pc set 3-4]
- IIIa (3^4), IIIb (3-1) and IIIc (1^4) [pc set 3-3]
- IVa (5-6), IVb (6^1), IVc (6-1) and IVd (7-6) [pc set 3-5]
- Va (3-4), Vb (3-5), Vc (4-5) and Vd (7-8) [pc set 3-11]
- VIa (8^4) and VIb (4-4) [pc set 3-12]

⁶Op. cit., page 68.

⁷Ibid. pages 23 and 25.

⁸A. Forte, op. cit., Appendix 1.

- VIIa (6[^]3) and VIIb (3-3) [pc set 3-10]
- VIIIa (2-3), VIIIb (2[^]5) and VIIIc (3-7) [pc set 3-7]
- IXa (2-5) and IXb (5-5) [pc set 3-9]
- Xa (8[^]2), Xb (4-2), Xc (2[^]6), Xd (8-6) and Xe (6-4) [pc set 3-8]
- XIa (2[^]3), XIb (10[^]1), XIc (11-3) and XId (3[^]1) [pc set 3-2]
- XIIa (4[^]2) and XIIb (2-2) [pc set 3-6]

Hyphenated numerals in parentheses, following cell shape names, show the intervallic distance between omni-directional notes (e.g. (1-4), meaning rising *or* falling semitone-plus-major third, or vice versa), whereas a [^] between numerals signifies a change of pitch direction about a central note (e.g. (1[^]2) meaning semitone down-tone up, or vice versa). The earliest compositional appearance of each cell shape type is given in Example 5.4a, as a representative model for each.

Additionally, there are 13 recurrent four-note cell shapes:

- cell 4-Z15 (2-3-1)
- cell 4-11 (1-2-2)
- cell 4-13 (1-2-3)
- cells 4-16a (2[^]8[^]1) and 4-16b (6-5-5)
- cells 4-19a (4-4-5), 4-19b (4-4-3) and 4-19c (4-4-1)
- cell 4-5 (1[^]2[^]8)
- cell 4-20 (4-3-4)
- cell 4-27 (4-3-3)
- cell 4-21 (4-6-4)
- cell 4-6 (5-6-11)

The earliest compositional appearance of each of these is given in Example 5.4b, with their pc set labels and intervallic profiles.

There are 4 recurring five-note cell shapes:

- cell 4-22 (3-4-5⁷)⁹
- cell 5-3 (7⁸9¹⁰)
- cell 5-Z17 (3-4-4-3)
- cell 5-34 (4-6-4-5)

These are shown in Example 5.4c.¹⁰

Some of the more commonly recurring cell shapes can be singled out as having special motivic significance. The most prominent are

- Ia (1²), Jarman's cell I, which pervades much of the texture of Piece No. 1, especially at the start and end, and returns as a significant element in bars 5-7 of Piece No. 4- Example 5.5a
- IIb (1-4), Jarman's cell II, which is also pervasive through much of Piece No. 1, and again returns in bars 5-7 of Piece No.4- Example 5.5b
- the 4-16a and 4-5 cells (2⁸1) and (1²8), which overlap in bar 2 of Piece No. 1 (i.e. the piano's A-Bb-Ab-E-Eb, which also contains cell Ia) and inform significant phrases in two other pieces (the start of the clarinet's bar 5 phrase, A-B-A-F-E, in Piece No. 3,¹¹ and the central notes, Ab-A-G-Eb, of the clarinet's final phrase in bars 18-19 of Piece No. 4); inherent within all of these is Xa (2⁸), a motivic cell in its own right in the *initial phrase* of Piece No. 1 (its notes 2, 3 and 4), in the same piece's 'tenor' line of bar 5 (C#-A-G), and in the *ostinati* of bars 9-12 of Piece No. 3 (i.e. the piano's D-Bb-Ab..E and the clarinet's Bb-Ab-E)- Example 5.5c
- XIb (10¹), which is distinctive in Piece No. 1, bar 5 (G#-Bb-B), in Piece No. 2, bars 1-2 (the clarinet's opening Eb-Db-C) and in Piece No. 4, bars 18-19 (the clarinet notes Gb-Ab-A and Eb-F-Gb-Ab from its final phrase)- Example 5.5d

⁹This cell has a pc (note) recurrence.

¹⁰The clarinet 5-3 cell of bars 7-8 in Piece No. 1 includes additional grace notes originally intended for inclusion by Berg, on F# (before the D) and F (before the Eb); these are present in one manuscript score (ÖNB Musiksammlung F 21 Berg 113, page 3), but crossed out in another (later?) copy (ÖNB Musiksammlung F 21 Berg 113, page 2), perhaps because an early pre-publication performer had asserted to the composer that they were impossible to fit in.

¹¹Noted by Headlam, op. cit., page 128.

- Ic (1-1), evident as chromatic fragments from the outset, first appears as a strong motive in Piece No. 2 (the thrice-stated Bbb-Ab-G in clarinet, bars 5-7), and becomes a cogent feature (sometimes extended to more than three notes) in the final two pieces (Piece No. 3, bars 1-3, 6-8 and 17-18, and Piece No.4, bars 1-10)

Some cells form a significant part of the intervallic structure of one piece in particular, and are rare elsewhere: most apposite in *Piece No.1* are

- VIIla (2-3), IIIb (3-1) and their conflation cell 4-Z15 (2-3-1)- Example 5.6a
- IIa (5-8), the first three notes of the *initial phrase*, and the lowest three of the final chord- Examples 5.1a, 5.2a and 5.32¹²
- the chordal Va/VIb/4-19b/5-Z17 group which is a particularly prominent element of the 'development', in bars 6-7- Example 5.6b

Piece No. 3 features VIIb (3-3), the diminished triad/diminished seventh *arpeggio*- Example 5.6c (anticipated at the end of Piece No. 2), and Piece No. 4 has IVc (6-1), IIIc (1⁴) and VIIIc (3-7)- Example 5.6d.

Other cells forge pitch structural links between sections or events, within individual pieces or from one piece to another:

- arpeggiated figures or triadically formed chords naturally contain the related V, 4-22 , VIb (the augmented triad), 4-19 and 4-20 cells; examples provide an aspect of 'tonal' reference, to the clarinet and piano *arpeggi* of Piece No. 1's *initial phrase*, bars 1-2, to the chords and *arpeggi* of the same piece's 'development', in bars 7-8, to the piano's falling *arpeggi* in Piece No. 3, bar 12, to the *ritornello* chord in Piece No. 4, bars 1-4 and 11-12, to the downwardly developing piano *arpeggio* also in Piece No. 4, bars 13-16, and to the final chord in the coda of the same piece, bars 17-20- these are all shown in Examples 5.6b and 5.7a
- the related IVa (5-6) and 4-16b (6-5-5) cells are common as quartal chord components in Pieces 1 (bar 4 and the bar 10 chord¹³), 2 (bar 5) and 3 (bars 4 and 9-12)- Example 5.7b

¹²Noted by Headlam, op. cit., page 185.

- cell IIIa (3^4) appears as the high-point of certain phrases, in Piece No. 2 (the clarinet's C-Eb-Cb segment in bars 4-5), in Piece No. 3 (the piano's F-Ab-E motive in bar 6), and in Piece No. 4 (the piano's Bb-D-B segment in bar 7)- Example 5.7c
- cell Ib (1^{11}), the falling conclusion to a clarinet phrase in Piece No. 1 (bar 4, Eb-Fb-F), is mirrored by the rising start to a clarinet phrase in Piece No. 4 (bars 4-5, Gb-F-E)- Example 5.7d
- cell XIc (11-3) provides an invariant link between part of the same falling clarinet phrase from Piece No. 1 (bar 4, Fb-F-D) and a rising mirror image within the piano *ostinato* in Piece No. 3 (bars 9-10, D-F-E-G)- Example 5.7e
- cell Xc (2^6) appears as part of two (mainly whole-tone) rising clarinet phrases, one in Piece No. 3, bar 12 (the segment G-F-B-A), and the other in Piece No. 4, bar 9 (the segment Gb-Fb-Bb)- Example 5.7f
- the 5-3 ($7^8 9^{10}$) cell links two wedge formations, in Pieces 1 (bars 7-8) and 4 (bar 10)- Example 5.7g
- the falling cell Vd (7-8) triad conjoins the *initial phrase* of Piece No. 1 (its notes 7, 8 and 9) and the final three notes of Piece No. 4's incrementally-increasing falling piano figure (Eb-Ab-C, bars 15-16)- Example 5.7h
- the conclusion of Piece No. 2 and the opening of Piece No. 3 are tied through the use of the augmented triad cell shape VIa (4^8)- Example 5.7i

Observation of the work's cell structuring can be taken one step further by investigating the bonding of cells into larger groupings. The following 5-note series are notable in Opus 5 for their overlapping cell correspondences:

- the numerous examples of the quasi-tonal pc set 5-20 are formed primarily from cells II, IV and V, and all feature the tetrachords 4-16 and/or 4-20 (Example 5.8a);¹⁴ cells IIb and X together form an association between Piece No. 2, bar 5 and Piece No. 3, bar 5; cells IVa, IXb and 4-16b together form an association between Piece No. 1, final

¹³The internal transposition of segments within a chord (in this case of (5-6) and (6-5-5) elements) has a parallel in Webern's Opus 7/2 (cell (3-6)) and Schoenberg's Opus 19/2 (cell (4-4))- see G. Perle, *Serial Composition and Atonality*, op. cit., page 29.

¹⁴Piece No. 2's two examples from bars 1-2 are pc invariant, a factor also noted by Headlam, op. cit., page 96.

chord, and Piece No.3, bars 9 and 13 (the latter an exact T-1 transposition of the Piece 1 chord segment- see Example 5.8a)

- those of the almost-whole-tone pc set 5-24 feature the tetrachords 4-21, 4-22 and 4-Z29 (Example 5.8b); cells IX and XIIb together form an association between Piece No. 1, bars 8-9 and Piece No. 4, bar 9
- instances of pc set/cell shape 5-34 (derived from notes 4, 5, 6, 7 and 8 of the *initial phrase*) share either cell V or IX, and feature 4-22 and/or 4-27 (Example 5.8c); cells Vc, Xe and 4-21 together form a transpositional association (at T-8) between chords in Piece No. 2, bar 4 and Piece No. 3, bar 3; cells Va and Vd together form a transpositional association (at T-6) between the opening of Piece No. 1, bars 1-2, and the final segment of Piece No. 4's incrementally-increasing falling piano phrase, bars 15-16
- 5-31s are associated through subsets VII and VIII together, and feature 4-27 and/or 4-13 (Example 5.8d); cells VIIb, VIIIa and 4-13 form a retrograded transpositional association (at T-11) between phrase segments from Piece No. 3, bars 1-2 (clarinet), and Piece No. 4, bar 7 (piano)
- 5-7s involve several shared sets, but all contain cell IV and/or II; associated tetrachords are normally a combination of two from 4-5, 4-6, 4-8 and 4-16 (Example 5.8e); cells IVa and IXb are associated together as chord components in Piece No. 1, bar 4 and Piece No. 3, bar 16; cells II and IV are associated together in Piece No. 1, final chord (bar 12) and Piece No. 4, bars 6-7 (piano); cells II and X and pc set 4-5 are associated together at the start of Piece No. 1, bar 2 (piano), and at the end of Piece No. 3, bar 18; cells I and IV are associated together in two interlocking strands (clarinet and piano) in Piece No. 4, bars 5-6
- 5-21s also involve several shared cells, but principally II and V, which often appear together; the principal tetrachord is 4-19 (Example 5.8f)
- two 5-27s share cell Va and pc set 4-20 (Example 5.8g)

The above examples show the following principal links (all diatonic) between 5-note groupings:

- 5-24 and 5-34 are 'connected' by 4-22
- 5-20, 5-24 and 5-7 are 'connected' by 4-16
- 5-34 and 5-31 each have 4-27
- 5-20, 5-21 and 5-27 share 4-20
- 5-20 and 5-7 have 4-8 in common
- 5-20 and 5-27 have 4-14 in common
- 5-20 and 5-24 share 4-29

The five-note set most 'connected' with other five-note sets by common tetrachords is the diatonic 5-20.¹⁵

Many of the 'common' tetrachords, i.e. 4-22, 4-16, 4-20, 4-27, 4-13, 4-6, and 4-5, also occur as shape cells; the two categories might be banded together, constituting a nucleus of tetrachords of prime significance in Opus 5. A complete inventory of these 'significant' tetrachords is given in Table 5.1.

Part B. Normative forms of organisation

1. Interval cycles and wedge formations

Interval cycle material is used far less widely in these four pieces than was the case with Opus 2, Opus 3 and Opus 4. Headlam points out two distinctive types. In the first, the clarinet notes G-A-C-E-A of the initial phrase (Piece No. 1, bar 1) have an expanding interval series, ics 2, 3, 4 and 5, while the final clarinet notes, A-D-F#, plus the initial piano note A (bars 1-2), have a descending interval series, 7, 8 and 9. He also records, in the second piece, cyclical patterns of interval pairs, i.e. decreasing in size in the clarinet descent of bar 5, with Eb-B (ic 4), Bb-Gb (ic 4), E-Db (ic 3), Cb-A (ic 2) and Ab-G (ic 1), and increasing in size in the clarinet continuation of bars 6-7, with A-Ab (ic 1), Gb

¹⁵The diatonic aspect of these sets is discussed further in Part C.5 of this chapter.

(Headlam erroneously has G)-E (ic 2), B-G# (ic 3) and F#-D (ic 4);¹⁶ to these one could add a static pattern of interval pairs in the bars 5-6 piano 'treble' line, with C-Eb, Bb-C#, G-Bb and E-G (all ic 3), a pattern of wider interval pairs in the piano's '2nd treble' line of bar 5, with A-E (ic 5), G#-Eb (ic 5) and F-B (ic 6), and a further 'static' pattern of interval pairs in the piano's '3rd treble' line of bar 5, with Eb-Db, C-D-C and Bb-G# (all ic 2).

A certain tendency towards the interval-3 cycle (the diminished seventh) in Piece No. 3 has already been noted, in the shape of cell VIIb. It has also been noted that the interval-4 cycle (the augmented triad) forms a link between Pieces 2 and 3, in the form of cell VIa. Headlam further observes that the augmented triad Bb-D-F# which concludes Piece No. 2 also forms two symmetrically spaced spans in the third piece, F#-D-Bb, encompassing the clarinet phrase at the start, and F#-Bb-D in the bar 13 chord;¹⁷ the triad reappears in the final piece, as part of the piano descents of bars 13-16. There are no extended instances of interval-5 cycles (of either fourths or fifths); only the three-note IX cells represent this pattern. The tritone (interval-6 cycle) is common, however, as a component of cell IV (found in all but Piece No. 2) and cell X (to be found in all four pieces).

Far more prominent are instances of the interval-1 cycle (semitonal) and interval-2 (whole-tone) scales. Extended chromatic scales occur in Piece No. 3 (bars 15-18, an ascending D-Eb-E-F-F#-G-Ab-A, but with descending octave displacements) and Piece No. 4 (the clarinet's rising runs on E-F-F#-G in bars 13-16), and a chromatic segment forms cell Ic, found in all but the first piece. But semitonal movement is more commonly associated with wedge formations of various kinds; Jarman's exegesis of those in the *first piece* runs thus:¹⁸

- rising and falling semitonal movement within the *initial phrase* (which can be interpreted as symmetrical widening at sum 3 or 6¹⁹); this is immediately followed in

¹⁶Op. cit., pages 185 and 96.

¹⁷Op. cit., page 96.

¹⁸Alban Berg: 'The Origins of a Method', op. cit.

¹⁹Headlam prefers to see a sum 3 wedge in the bars 1-2 clarinet notes Ab-G to A-F#, op. cit., page 186.

bar 2 by the sum 6 widening of the cell Ia figure, i.e. A-Bb-Ab sounded by both instruments in turn (Example 5.9a), and

- two wedges forming the entire content of the clarinet part, from the top D of bar 7 through to the final low G, one widening from the initial D (sum 4), and the other narrowing to the ultimate G (sum 2);²⁰ two unusual features are (i) the octave displacements involved, and (ii) the use of the descending line D to G as a component of both wedges (Example 5.9b)

The first piece's other wedge formations are smaller, or involve a static element:

- an asymmetrical widening centred on a constant D develops in bars 3-4 (Example 5.10a)
- bar 5 has an element of widening sum 6 symmetry at its centre point, together with other expanding movement of parts (Example 5.10b)
- bars 7-9 have a widening (asymmetrical) wedge in the piano, incorporating a constant A (Example 5.10c)

Symmetrical wedges occur in the subsequent pieces,

- briefly in Piece No. 3, in the three-note figures of bars 1-3 and in bars 15-16 (at sum 4) (Example 5.11a)
- more extensively in Piece No. 4, in bars 9-10, and in both instruments (at sums 2 and 0) (Example 5.11b)

Many other instances of semitonal movement involve parallel parts, sometimes with contrary motion in one other part, and sometimes with progressions involving intervals of more than a semitone.²¹

Instances of whole-tone formations and the whole-tone scale are limited to

- the largely whole-tone chord of bars 8-9 in Piece No. 1, i.e. D-Gb-Ab-Bb-C-(F)

²⁰Noted also by Headlam, *op. cit.*, page 186.

²¹These are discussed more fully as 'transformational patterns' in Part C.1.

- a complete downward scale of an octave and a half, in the clarinet part of bar 16, in Piece No. 3, i.e. C#-B-A-G-F-Eb-C#-B-A-G
- the piano's wedge formation in bars 9-10 of Piece No. 4- see Example 5.11b (using the F-G-A-B-C#-D# whole-tone scale, with chromatic infilling to the moving parts)

Allusions to the kind of linear whole-tone alternation found so extensively in the second movement of the Opus 3 String Quartet occur during the even-summed symmetrical wedges of Piece 1 (Example 5.9b), Piece 3 (Example 5.11a, first part) and Piece 4 (Example 5.11b, first part), and elsewhere in all four pieces (Example 5.12a) including, characteristically, the *initial phrase* itself. There is also a suggestion of the Quartet movement's 'foreign-note' whole-tone harmonies in some of the chord sequences of each piece (Example 5.12b).

2. TINVs and aggregate systems

Pure examples of TINVs (transpositionally invariant set classes²²) are comparatively rare in Opus 5. Instances of tritonal (pc set 2-6), augmented triad (3-12), diminished seventh (4-28) and whole-tone groupings have already been noted. The French sixth (4-25), prominent in Opus 3 and Opus 4, appears as a significant sonority just twice, in Piece No. 3 in bar 8 (as the concluding chord of the first section) and in Piece No. 4 (as the basis of the piano's wedge sequence in bars 9-10)- Example 5.11b; the 4-9 tetrachord (the '*Lulu*' basic cell) is just as rare as a discrete entity (instances occur in bar 6 of the first piece- the piano's treble-note phrase Eb-E-Bb-A, and in bar 6 of Piece No. 4- the piano's entry on C-B-F-F#)- see Example 5.13a. There are single instances of 6-20, the hexatonic collection, in each piece, and a few of the 9-note TINV, 9-12 (e.g. the clarinet arpeggiated figure in bar 7 of the first piece)- these are shown in Example 5.13b. There are *no* overtly stated 12-note 'themes' or chords, as there were in Opus 3 and Opus 4, and there is no direct evidence of the full

²²Ssee R. Cohn, 'Properties and Generability of Transpositionally Invariant Sets', in *Journal of Music Theory*, op. cit.

octatonic collection (8-28) or of the other 6 or 8-note TINV collections in fully-realised form (i.e. 6-7, 6-30, 8-9 and 8-25).²³

Part C. Structural networks

1. Networks of transformation and linkage

For Perle, the cell structures in Opus 5 are subjected continually to Berg's typically-atonal normative procedures of 'repetition, symmetrical structures, chromatic inflection, and progressive transformation patterns'.²⁴ Adorno's more poetic response was that '[the] pieces generate their form by everywhere and immediately creating, shattering, abandoning, reintroducing, and rounding off remnants',²⁵ and that they 'were created out of that sudden transformation of dynamism into stasis'.²⁶ Such an interpretation is supported by DeFotis, who sees the composer 'omitting the expected continuations and resolutions', and at the same time 'interpolating transformations ... [and] dwelling upon pivotal moments of those transformations'.²⁷

While Perle's 'repetition' is consistently present through the cell structure relationships, and 'symmetrical chords and progressions' are also to be found, most often in the third and fourth pieces (Examples 5.11 and 5.12 show some of the more prominent ones), the more general processes of 'progressive transformation patterns' are particularly potent in this work. They occur in those places where chord progressions widen or diminish to give the music its dramatic power and shape. In *Piece No. 1*, much of the clarinet line can be seen in this light. i.e. widening in bars 1-2, bars 2-4 and bars 7-8, and narrowing in bar 9. Concurrently, the piano texture of bars 3-5 also displays a widening of parts: there is a direct correspondence of effect between these patterns and the wedge formations described

²³The many instances of significant fragments from these aggregate collections are investigated in Part C.5 of this chapter.

²⁴*The Operas of Alban Berg: 'Wozzeck'*, op. cit., page 11.

²⁵Op. cit., page 69.

²⁶Ibid., page 68.

²⁷William DeFotis, 'Berg's Op. 5: Rehearsal Instructions', *Perspectives of New Music*, Vol. 17, No. 1 (1978-9), 131-137 (page 131).

earlier (Example 5.10). The expansion and contraction of durational values within rhythmic patterns is another form of progressive transformation in the first piece, e.g. in the treatment of the pc set 5-24 chord of bars 8-9 and the final chord of bars 10-12; a further example occurs in bar 5, through a general quickening of note values in both instruments; Berg also uses *accelerandi* and *ritenuti* to create or enhance this effect, as in the treatment of the piano left-hand progression in bar 7 which has alternate quavers and crotchets in *accelerando*, in the bars 8-9 *accelerando* and the bars 10-12 *ritenuto*, and in the ambiguous quickening of note values against *ritenuti* in bars 5 and 9.

Perhaps the first piece's most vital 'transformational patterns' involve the three main chord progressions in bars 3-5, bar 6 and bars 7-8. In each of these the movement of parts to some extent retains certain characteristic stepwise intervals throughout the sequence of chords, yet also admits certain vital alterations to those intervals. Thus, in the first sequence of bars 3-5, the falling major thirds between the 'bass' and 'tenor' of the first three chords become fourths in the next two, and a fifth at the start of bar 5; this factor works in conjunction with a central pedal D and a rising melody line to produce a progression which contains a series of 4-note chords which includes many of the 'significant' tetrachords, including the 4-16b cell which recurs in bar 10's extreme treble, and two examples of the pc set 3-5 orientation (perfect fourth plus augmented fourth: cell IVa) which reappears prominently in the same bar 10 chord; the flow of music is then propelled forward into bar 6 through a series of even more widely spaced chords.

In bar 6, each chord of a falling sequence contains a prominent augmented triad; rich 'R-related'²⁸ chords are produced through the parts falling by a mixture of tones and semitones, while a treble melody line rises against this, as it did in the previous progression.

²⁸R-relation: a similarity relation involving maximal closeness of either 'normal order' or 'interval vector' between pc sets of the same cardinality; see A. Forte, op. cit., pages 46-48.

The third sequence, in bars 7-8, is even more dramatically significant. The number of notes increases by one in each chord, from a pc set 3-4 spread chord at the start of bar 7 through to a 6-34 sonority in bar 8; again, parts move by step, but in a widening asymmetrical wedge, via two intervening symmetrical spread chords, pc sets 4-3 and 5-Z17: Example 5.14 shows a pattern of interval expansion here involving ic 2, then ic 1, and finally a further ic 1 (invariant pcs are joined by a broken line). The progression ends on a predominantly whole-tone sonority, one which by bar 9 becomes part of a larger pc set 8-24 complex which in turn anticipates eight of the nine pitches used in the 9-6 chord of bar 10. This latter bar's extra pitch, the clarinet G, is already being worked towards in the clarinet part's wedge, starting from the high D in bar 7.

Piece No. 2 has elements of expansion in both instruments, with the first beat of bar 5 as an apex, featuring the clarinet's highest note and the piano's widest chord (excluding its final low Bb); the piece also contains a continual oscillation of changing note-values, having the effect of both *accelerando* and *ritenuto* on repetitions of single notes (such as the major third D-F#) or of short phrases (e.g. the clarinet Bbb-Ab-G in bars 5-7).

Piece No. 3 has a series of progressions or sequences of notes which shape the piece as a whole, and which provide a continuity of linkage within each of the three sections.

In bars 1-8 are found:

- several small wedge-like phrases in the piano at the start, involving semitonal movement between whole-tone-plus-foreign-note harmonies (Examples 5.11a and 5.12b), gradually falling against a rising clarinet part; the final chord of the series (bar 3's augmented triad D-Gb-Bb) links (Example 5.12b) through a semitonal movement of parts involving a whole-tone alternation to
- a more dramatically widening sequence in bars 3-5 moving from a 6-note, largely whole-tone chord (pc set 6-34), via a 5-note chord of piled-up major sevenths, E-Eb-D-C#, plus an added G# creating a quartal D-G#-C# in the right hand (pc set 5-5), to a quasi-tonal pc set 4-19 ('tonal' because of the left-hand perfect-fifth F#-B which doubles pcs present in the right hand); in the same right hand *tessitura*, there is then

- a slight narrowing of four-part harmony in bars 5-8 from the bar 5 pc set 4-19 to the bars 7-8 pc set 4-25

In bars 9-13 there are rising *ostinato* figures in both instruments (bars 9-12), resolving in bars 12-13 into falling *arpeggi* in the piano set against a continually rising clarinet part. Bars 14-18 feature a wedge-like widening of parts (Example 5.11a), moving from a reiterated major third C-E to a final widely-spaced chord (pc set 4-5) using the *initial phrase's* first four pitches, Ab-Eb-G-A (reading from the treble downwards); set against this, the clarinet has a downward whole-tone, then chromatic scale.

Many of the third piece's static features (repeated chords, *ostinati* and the retention of *tessiturae*) are again present in the *fourth piece*, providing most of the basic material. The *ritornello*, a repeated chord, regularly tolls in bars 1-4, but sounds progressively more quickly in bars 11-12; the *Echoton* clarinet B-C# figure of bars 12-13, (progressively *slower* against the quickening chords), is not merely re-sounding and continuing the piano B-C#s of bars 9-11, but is also reprising, at the same pitch-level, the opening note of each of the clarinet phrases which accompany the repeated chords in bars 2-4 (i.e. the B from bar 2 and the C# from bar 3). The next section (bars 12-16) consists of dramatic expansions of single elements in each instrument: the final note of each clarinet slurred phrase rises by a semitone and is repeated with extra (upward) octaves and grace notes on each statement, while the piano phrases lengthen by one note at each occurrence, and with increasingly fast note-values; both parts increase correspondingly in volume, from *p* to *ff*.

This fourth piece also has static features in the oscillating chords passage of bar 8 (with slowing note-values in the clarinet), within the wedge sequence of bars 9-10 (i.e. the central B-C#), and in the *coda* (its held major seventh/pc set 4-20 chord). Complete variety is only to be found, then, in the short contrapuntal passage of bars 5-7, where a remarkable combination of intervallic cells is incorporated into the texture- Example 5.15.

2. Networks of 'modulation': diatonic allusion and focal centres

While diatonic characteristics can be attributed to many harmonies having a triadic or 'seventh' chord appearance, these rarely relate to each other as diatonic progressions (as they often did in the Opus 2 songs).²⁹ Tonal centres, where they exist at all, arise through the prominence given to certain pitch classes through reiteration or the directed movement of parts (including wedge-formations), or where diatonically-orientated cells combine/overlap into larger 'quasi diatonic' groupings.

Piece No. 1 displays a complex network of referential pitch classes, some of which have a focal significance as pitch centres. Several linear segments within the first five bars contain the tetrachords 4-5, 4-16, 4-Z15 and 4-Z29, and often within these linear tetrachords particular referential pairs of pcs are prominent, i.e. G with A, C# with D, Eb with E and Bb with Ab (Example 5.16b). One of these 'referential pitch pairs', A-G, assumes added significance, as the major second component of three prominent 3-8/Xa cells, in bar 1 (Eb-G-A), in bar 4 (A-G-Eb, the bar 1 cell in retrograde) and in bar 5 (C#-A-G in the piano, an inversion of the bar 1 cell).

Considering all of the possible theoretical 'referential pitch pair' tetrachords which can be permuted from the *initial phrase's* 8-Z29, most would contain the tritone-related referential pcs Ab and D, while all 4-5s specifically contain Ab and all 4-16s contain D (Example 5.16c); these two pcs also have an *explicit* significance in the *initial phrase*, since they occur as the first-beat notes of bars 1 and 2, and will receive a certain emphasis in performance. Thereafter, the notes of this tritone are associated as a consistent factor in nearly every bar of the piece. The Ab (first note of the *initial phrase*) assumes theoretical prominence since all of Jarman's three-note intervallic cells, and also cell VI, can be extracted from the initial 6-Z44 using this pc plus two others from the set (Example 5.16a).

²⁹An exception being the progression in bar 5 of Piece No. 2, to be discussed later.

The presence of referential pitches in Berg's works of this period has already been outlined in Chapters 2, 3 and 4, and has also been described by Samson; he singles out D with its attendant semitonal satellites C# and Eb as being especially notable;³⁰ these constitute three of the eight 'referential pitch pair' members here under discussion (three others, Ab, G and A (together with D), have already been selected, in the paragraphs above, as being significant).

Two of the referential pcs, G and D, display a particular *focal* significance. The *initial phrase's* G-A-C-E-A-D-F# suggests an orientation towards G major/minor, as does the following pc set 6-20 group F#-G-Bb-B-D-Eb of bar 2 (in the piano). The bass G of bar 2 is followed in bars 3-5 by a pedal D (partly in the bass of the piano and partly in its 'tenor' region) which from bar 5 acts as the start of a descent which leads ultimately to the deep bass D in bar 8. Meanwhile, in bar 5, the piano's right hand treble line strives for D through reiterated C#s (D's referentially-associated pc); D is also being sounded in the clarinet at this point, through the repeated F-D figure, and D is finally reached in the treble, at the start of bar 6 (although immediately undermined by an Eb above it). The pitch G is similarly striven for in the ensuing bars, since it is virtually a missing element from the pitch content between the clarinet's low G of bar 6 and the same instrument's low G at the end of bar 9 (the note which then underpins the chord of bars 9-11); while this pitch is being 'held back' it is at the same time inexorably being approached through the clarinet wedge formation of bars 8-9. In all these respects, G and D might be considered to be polar pitch centres for the piece.³¹

Of relevance here is an invariant pc set 5-21 F-A-Bb-C#-D, often suggestive of a quasi-D minor in its orientation of notes, which first occurs in bar 3 (mainly clarinet) and thereafter persistently re-establishes itself, as a component of bar 4 (beats 3 and 4), bars 5-6 (in the clarinet), bar 7 (in the clarinet *arpeggio*), bars 7-8 (in the crotchet beats either side of the barline) and bars 8-9 (in the piano, in the crotchet beats either side of the barline)- some of

³⁰J. Samson, *op. cit.*, pages 159-160 and 213-215.

³¹A conclusion reaffirmed by Headlam, *op. cit.*, page 186.

these are shown in Example 5.18. Within these 5-21s are usually one or more explicit 4-19s, e.g. F-A-C#-D or F-A-Bb-C#. The former is perhaps the most commonly found pitch grouping in the piece, appearing fairly consistently between bars 3 and 9; as well as informing the invariant 5-21s, this grouping also appears as part of the second chord of bar 6. It seems likely, therefore, that these particular groupings of pitches are being used as a form of (polar) stability within a variety of larger textures.³² It is also possible that Berg could have considered the pitch D in bars 3-5 to be performing the function of polar centre for 'dominant'-based exposition material, in a way analogous to that traditionally found in a sonata movement, against which the 'home-key' centre might be G, to be found in the prime expositive material of bars 1-2 (with the piano's left-hand G major/minor orientation).

Certain short passages in the first piece present elements of bitonal contrast between different *tessiturae*, for instance where a bass E major operates against treble C/G/F majors at the start of bar 7, a bass Bb minor against clarinet D at the end of bar 7, and F minor against E in the bar 9 reprise of the *initial phrase*'s first six notes.

Focal centring in *Piece No. 2* goes much farther than the simple structure suggested by the 'tonicising' piano left-hand major thirds D-F#, F-A, Db-F and again D-F# which are iterated during the course of the piece. The whole of bars 4-6 can be viewed in terms of a complex chord sequence cadencing in Db.³³ Most of the chords in the sequence contain a minor seventh plus major third (from the bass)- the pc set 3-8 formulation found commonly in Opus 3- giving a bass-root appearance to each chord. Example 5.17 shows these 'dominant seventh' components, and gives a 'tonal' analysis to the passage as a whole (with some notes enharmonically changed); an interpretation of the central three chords would be to emphasise their role as a voice-led prolongation of the initial Ab minor ninth chord. This reading, involving an extensive V-I cadence, throws greater emphasis on the Db-F major

³²Incidentally, four of the five pitches under discussion are referential pitch pair members.

³³There is an Ab/Db 'key' focus in the clarinet's contribution, too, i.e. Eb-Cb-Bb-Gb-Fb-Db-Cb-Bbb-Ab-G.

third as a central focus, and to some extent relegates the opening and closing D-F# focus to a subsidiary role.

In *Piece No. 3*, the augmented triad C-E-G# (cell VIa) provides an abiding point of reference both at the start and at the end of the first section (where the triad returns in bars 5-8 in the form of motives containing E-C in the clarinet and Ab-E in the piano), although its effect is constantly attended by the ameliorating influence of whole-tone-plus-foreign-note groupings from the contrasting whole-tone collection, G-B-C-C# in bar 1, G-C#-F-B-Eb-Ab in the bar 3 chord, G-B-D#-F# in the bar 5 chord, and the whole-tone G-A-Db-Eb in the bar 8 chord. The middle section (bars 9-13) allows a return of influence to G (as the initial bass note to the piano's *ostinato*) and D (in bar 13, as the resolution to the upward climb in the clarinet, E-G-F-B-A-C#-B-D, supported by the lowering of the bars 9-12 bass note G to F#, creating a quasi-minor 9th/minor 13th first inversion chord on D). The return of C and E in bars 13-14 is facilitated through these notes' symmetrical relationship about a still-focal D (focal, that is, as the start of the piano's left-hand chromatic ascent/descent *and* the centre-point of its right-hand wedge-formation, and also as the implied companion to the clarinet's C#-B *Echoton* figure (as it was an octave higher in bars 12-13) *and* the destination of its whole-tone/chromatic descent).³⁴ The piano's final chord deviates from the sum 4 D-centred movement of parts, relating retrospectively to the bar 3 pc set 6-34 chord through its replication of the upper two notes, Eb-Ab, as well as to the first four notes of the first piece's *initial phrase* at T-0.

The *fourth piece's* C-based chord (suggesting a quasi-C major/minor tonality) issues naturally from the final sonority of the previous piece through an invariant subset, G-G#-D# (pc set 3-4, and, in Piece No. 3, cell IIa); it also incorporates the C-G#-E augmented triad from the third piece's opening gesture. In bars 10-11, the clarinet's widening (sum 2) wedge settles on a repeated dyad D-C (the two foci of Piece No. 3) while the epicentre of the piano's narrowing (sum 0) wedge, B-C#, suggests both an axial C and a 'tonally' voice-

³⁴The pitch D is presented as an abiding focus for the whole piece in a monograph by Christopher Lewis: Christopher Lewis, 'Tonal Focus in Atonal Music: Berg's op. 5/3', *Music Theory Spectrum*, Vol. 3 (1981), 84-97.

led straining towards D (the same two foci); both transpire to be a goal of sorts, through the return of the C-based chord in bars 11-12, and the piano's B-C#-D of bars 12-13. The conjunction of D, G and C as focal pitches is affirmed in the final eight bars (D in the piano, bars 14-16, through the B-C#-D, G in the clarinet, bar 16, as the goal of the chromatic *glissandi*, and C in the piano, bars 17-20, through the C-based seventh chord), with C seemingly having the final say.

3. The control of tension and structural shape in Piece No. 1

An anomaly of intent between the dramatic nature of Opus 5 and its extreme brevity creates tensions within this work that have fascinated many Berg writers. These tensions reflect a conflict within the Schoenberg school between on the one hand the assertion that only short pieces could be written in the newly evolved atonal idiom and on the other hand their espousal of Expressionism, the then current common form of utterance in Austro-German art and literature. While these two contrary facets allowed the production of aphoristic works of extreme concentration from Webern, in particular, Berg's Opus 5 essay in miniature forms breaks the bounds normally associated with such concision and compromise. Perle comments that the Four Pieces have 'the effect of a large-scale work based on traditional concepts of balance and contrast' where Berg's 'imposition of a classically proportioned design upon a "content" of great dramatic power and urgency produces its own tension...'³⁵ Adorno characteristically remarks that the unfolding of extreme and sudden change between dynamism and stasis in these pieces causes the passage of time to be 'contracted and made to seem like an instant, whereas by contrast Webern, as Schoenberg said, compresses a novel into a sigh.'³⁶

The tensions between dramatic extremes of expression and a brief but balanced sonata structure are acutely manifested in the *first piece*. The interaction between elements of reflexive and normative function is an important factor in the creation of an underlying ebb

³⁵George Perle, 'Berg', in *The New Grove Second Viennese School: Schoenberg, Webern, Berg*, by Oliver Neighbour, Paul Griffiths and George Perle (London: Macmillan, 1983), pp. 137-197 (page 147).

³⁶Op. cit., page 68.

and flow evident within the overall basic structural shape. Bars 1-5 (which might be considered to contain a continuity of expositive material, finally interrupted by the quaver rest in the piano part at the start of bar 6) are characterised by

- the referential pitch pairs, together with their associated 4-note cells situated within 8-note 'themes', and the pc set 3-8 cell in its distinctive Xa motivic shape- Example 5.16b
- semitonal movement of parts, within pc set 4-5, 4-16 and 4-Z15 cells, and as semitonal attachments to augmented triads (3-12s), often an invariant F-A-C#, forming pc set 4-19 and 5-21 textures in bars 3-5 (Example 5.18), and providing a stable environment for these bars' otherwise shifting contrapuntal textures, particularly through the common use of the 4-19 grouping D-F-A-C#

Bars 9-12 recapitulate several elements from the first five bars (starting from the *caesura* and comma in bar 9):

- the above mentioned pc set 4-19 and 5-21 textures, again built around the stable augmented triad F-A-C#
- a T-8 transposition of the first six notes of the *initial phrase* (in bar 9: see Example 5.2a)
- many of the distinctive motivic shapes from bars 1-2, e.g. cell 3-4/IIa from bar 1, the 4-5 and 4-16a cells using the pc set 3-1/Ia motivic cell from bar 2 and the IVa/4-16b chordal formation from bar 4
- other transpositions of elements from the first section (at T-2 and RI-6, shown in Example 5.19a)

This leaves a development section, from bar 6 to the pause in bar 9.³⁷ The distinctive harmonic features here are

- the augmented triad as a basic element of harmony, again with accrued semitones from the other whole-tone area forming chords featuring pc sets 4-19, 5-21, 5-Z17 and 5-Z37; however, these augmented-triad-based chords tend to shift rapidly between

³⁷This is rather larger than Adorno's suggestion, which confines it to bars 7-8: for Adorno, the clarinet trill of bar 6 represents a *caesura* between exposition and development; *ibid.*, pages 69-70.

different augmented-triad bases, contributing to the creation of dramatic and volatile changes of harmony, apart from an invariant augmented triad Gb-Bb-D which defines the start and end of the section (piano, bar 6, and piano, bars 8-9)

- the two 'progressive transformation pattern' progressions of bar 6 and bars 7-8 (which incorporate the augmented-triad-based chords); these each introduce a considerable widening and deepening to the piano's pitch range, adding further to the increasing feeling of drama: in bar 6 the treble line rises for the first time above treble-stave C# (the striving pitch of bars 4-5), while in bars 7-8 the bass extends downwards below the stave for the first time

An examination of tritones also reveals a variety of functions. Eb and A, for instance, appear together only in bars 1-7 (providing an invariant link between the opening pc set 4-5 and the bar 5 pc set 4-Z15), while F# and C (their diminished-seventh tetrachord partners) are found together only in the remaining bars of the piece; in fact, one or other of these tritones is a fundamental constituent of the opening four-note group of each section, the 4-5s of bars 1 and 6 having Eb-A and the 4-16 of bar 9 having F#(Gb)-C- Example 5.19b.

The E-Bb tritone pair, by contrast, appears prominently only at a few specific structural points, in the overlapping pc set 4-5/4-16 groupings of bars 2 and 10, and at the start and end of the development (bar 6's first chord and bar 9's two clarinet notes at the pause). Ab-D, as has already been shown, remains a consistent factor throughout the piece, while F-B and G-C#, the other two tritones, figure hardly at all.

Ultimately, most aspects of structure in this first piece are dependent on five significant tetrachords, each having its own particular type of function. They can be grouped into two basic and distinct categories according to the general functions which they perform: the 'referential pitch-pair' pc sets 4-5, 4-16, 4-Z15 and 4-Z29 have a linear and developmental function, since they (and their 8-note complements) lend themselves primarily to the establishment of basic intervallic cells and interval patterns, and to the formation of

motivic and thematic material; pc set 4-19, on the other hand, provides the basis for many of the harmonic textures, and subsequently has a bearing on the establishment of polar pitch centres within the piece.

The only *exclusive* factors which distinguish each of these two categories are straightforward: pc set 4-19 contains the augmented triad, while the other tetrachords contain the interval of a tritone. An examination of all of this piece's principal tetrachords shows that many hold the tritone (i.e. pc sets 4-5, 4-6, 4-8, 4-9, 4-12, 4-13, 4-Z15, 4-16, 4-18, 4-25, 4-28 and 4-Z29), just one (pc set 4-19) holds the augmented triad, and only one (pc set 4-24) holds both.

4. Some asymmetrical pc sets as potential bases for 'atonal' aggregate systems

While dichotomies between symmetrically-arranged groupings operate frequently in Berg's Opus 2, 3 and 4 (whole tone with octatonic, for instance, in the fifth *Altenberg* song), an expansion of such dualities is now required, to include set associations with less-overtly recognisable pitch formations, such as those found in Opus 5.

This work's dearth of symmetrically-based organisational 'systems' and its often unequivocal atonality necessitates the application of some specifically asymmetrical and atonal system bases from which characteristic attributes might be identified and through which apposite comparisons with other 'systems' might be made. Potential universal atonal candidates specific to this work might be the *initial phrase's* pc sets 6-Z44 and 8-Z29, and their Z-relations 6-Z19 and 8-Z15.³⁸

Example 5.20 investigates both theoretical and compositionally-projected relationships between these common Z-related sets. Example 5.20a shows how the two Z-related 8-note

³⁸8-Z15 and 8-Z29 share the interval vector (see A. Forte, op. cit., page 210) 555553, whose equal incidence of all ics (ic 6 has a smaller number due to inversional invariance) equates to the 111111 all-interval vector of the complementary tetrachords 4-Z15 and 4-Z29; 6-Z19 and 6-Z44 share the interval vector 313431, and are complementary (i.e. together they can make the full 12-note aggregate).

sets (8-Z15 and 8-Z29) are almost identical, since if the larger whole-tone component of each (pc set 5-33) has the same pc content (although reordered), the necessary T-6 transposition of the other whole-tone component (pc set 3-8/cell Xa) nevertheless has two of its notes invariant and the other note as its tritone 'partner'. These 'almost-identical' sets closely resemble another 8-note set, the TINV 8-9: the example shows how the substitution of 8-9's G for an E creates 8-Z15, and the substitution of its C# for an E creates 8-Z29. The example also shows how a T-7 transposition of the 8-Z15 in its *initial phrase*-orientated ordering matches closely the actual alignment of the 8-Z15 'theme' found in bar 5 of the first piece, revealing an unexpected correspondence of compositionally-projected invariant groupings of pcs (of the bar 5 8-Z15 in relation to the bars 1-2 8-Z29), with the same 5-33/3-8 whole-tone division.

Example 5.20b shows the relationship between the complementary pair 6-Z19 and 6-Z44. This time, a whole-tone division shows both to have a pc set 3-12 (the augmented triad) from one whole-tone area and a pc set 3-8 from the other; the difference is one of placement between the two three-note groups. As before, each of this Z-related pair closely resembles a TINV, this time pc set 6-20 (the hexatonic scale, itself constructed from two augmented triads a semitone apart): the example shows how complementary 6-20s can be altered into the two asymmetrical Z-related hexachords by swapping one note 'sideways' with a neighbouring (whole-tone) note. Example 5.20b also shows an alternative form of division revealing a similarity between the three hexachords which is projected compositionally at the start of the fourth piece: the example's fourths/fifths division of each shows two fifths, C-G and G#-D#, remaining invariant (forming pc set 4-9), and the 6-20's other fifth, E-B, turning first into 6-Z44's fourth, E-A (projected through the clarinet's contribution descending from B to A in bar 2), and then regrouping into the 6-Z19 (produced through the clarinet's contribution, now C#, aligning, fourths-wise, with the G#-D# fifth in bar 3).

If a complementary 6-Z19 and 6-Z44 are compared (i.e. such that the full 12-note aggregate is produced), a further whole-tone association is evident: Example 5.20c shows

that the pc set 3-12 (augmented triad) from each will combine to make one complete whole-tone scale (pc set 6-35) and the remaining pc set 3-8 from each will combine to make the other whole-tone scale; looked at this way, the asymmetrical Z-hexachords are each 'mutations' of the symmetrical whole-tone 6-35 TINV (i.e. as well as of the hexatonic 6-20 TINV).

Example 5.20d shows that a similar constructional relationship exists (theoretically) between the 4-Z15/4-Z29 pair. A whole-tone division this time reveals a 3-8 set in each, with the remaining note relating semitonally to it, although in a different way. An alternative view shows each having a tritone and a minor third dyad, although aligned in different ways. Example 5.20d also shows one unique property that these two tetrachords have together, since they can be combined to form pc set 8-28, the octatonic scale,³⁹ or 8-25, another of the 8-note TINVs; in the first instance, the tritones from both combine to form one diminished seventh tetrachord (4-28) while the minor thirds from both combine to form the octatonic collection's other 4-28, and in the second instance, the tritones from both combine to form a French sixth (4-25) while as before the minor thirds from both combine to form a diminished seventh (4-28), the 8-25 set's remaining four pitches; the Z-related pair are, in these contexts, acting as 'mutated' diminished sevenths or as 'mutated' diminished seventh-plus-French sixth (as, perhaps, the 8-Z15/8-Z29 pair were shown to be altered 8-9s and the 6-Z19/6-Z44 pair were altered 6-20s or 6-35s). The example finally shows that the other 8-note TINV, 8-9, can be constructed from prime and inverted forms of the *same* Z-tetrachord, i.e. two 4-Z15s or two 4-Z29s; in this case, the minor thirds from both constituent sets form a diminished seventh as before, while the tritones from both this time combine to make pc set 4-9 (the *Lulu* basic cell).

³⁹Unique in this instance, since all other tetrachordal divisions of an octatonic scale produce two sets of the same type, one the transposition and/or the inversion of the other- see Example 4.15b.

The three theoretical formations of Example 5.20d can be expressed 'mathematically' thus:

i) $4-28 + 4-28 = 4-Z15 + 4-Z29 = 8-28$

(so, $4-28 + 4-28 + 4-28 = 4-Z15 + 4-Z29 + 4-28 =$ the 12-note aggregate)

ii) $4-28 + 4-25 = 4-Z15 + 4-Z29 = 8-25$

(so, $4-28 + 4-25 + 4-25 = 4-Z15 + 4-Z29 + 4-25 =$ the 12-note aggregate)

iii) $4-28 + 4-9 = 4-Z15 + 4-Z15 = 4-Z29 + 4-Z29 = 8-9$

(so, $4-28 + 4-9 + 4-9 = 4-Z15 + 4-Z15 + 4-9 = 4-Z29 + 4-Z29 + 4-9 =$ the 12-note aggregate)

A potential system based on 6-Z44 and 6-Z19 would consist of the following subsets:

- all 3-note pc sets/cells *except* 3-6/cell VII, the diminished triad
- pc sets 4-3, 4-4, 4-5, 4-7, 4-8, 4-12, 4-14, 4-Z15, 4-16, 4-17, 4-18, 4-19, 4-20, 4-26, 4-27 and 4-Z29 ('significant' tetrachords are underlined)
- pc sets 5-3, 5-6, 5-16, 5-Z17, 5-Z18, 5-20, 5-21, 5-22, 5-Z37 and 5-Z38 (cell-shape and recurring pentads are underlined)

That based on 8-Z29 and 8-Z15 would contain *all* of the 3-note, 4-note and 5-note pc sets as subsets, plus

- all 6-note pc sets *except* 6-1 (the chromatic scale), 6-5, 6-7 (the '6-7' TINV), 6-8, 6-14, 6-20 (the Hexatonic TINV), 6-32 (a Diatonic set) and 6-35 (the Whole-tone TINV)⁴⁰
- the following 7-note sets: 7-5, 7-6, 7-9, 7-10, 7-13, 7-16, 7-19, 7-20, 7-24, 7-28, 7-30 and 7-32

Table 5.2 lists all of the 3, 4, 5 and 6-note pc sets ('significant' tetrachords and 4 and 5-note cells and recurring sets are asterisked) and shows their inclusion in the various systems including 6-Z19/Z44 and 8-Z15/Z29 (the latter labelled 'Atonal'); the list also includes

⁴⁰Thus proving usefully exclusive and independent of the other systems.

those 7 and 8-note sets associated with the designated systems, but excludes all others (for reasons of space). While 6-Z19/Z44 has the more manageable number of subsets for comparative purposes, the larger 8-Z15/Z29 (Atonal) universe has the advantage of corresponding very closely to the demonstrable pc set content of Opus 5.

Pc set 7-21 has been included in the table as the basis of a further (potential) discrete system because, although one of the most commonly-found 7-note groupings in Opus 5, it does not figure in any of the other designated systems: its inclusion also allows one otherwise discounted grouping, pc set 6-14, to be included. Finally, since whole-tone-plus-foreign-note harmonies are common in parts of Opus 5 (Example 5.12b), such pc sets are also featured in the table, labelled (WT+1) in the Whole-tone column.

A number of pertinent observations can be made from the table:

- the trichords most commonly contained across the systems categories are pc sets 3-4 and 3-8, while the most widely shared tetrachords are 4-6, 4-8, 4-13, 4-16, 4-17, 4-18, 4-19, 4-20, 4-26, 4-27 and 4-Z29 ('significant' tetrachords are underlined)
- relatively larger counts of tetrachord type are contained within the atonal systems 6-Z19/Z44, 7-21 and 8-Z15/Z29, compared to other systems
- there is a low coincidence of 5-note sets between the 6-Z19/Z44/7-21 atonal systems and the Diatonic and TINV systems (although pc set 5-16 is both Octatonic and 6-Z19/Z44/7-21, pc set 5-20 is both Diatonic and 6-Z19/Z44/7-21, pc set 5-21 is both Hexatonic and 6-Z19/Z44/7-21,⁴¹ and pc set 5-32 is both Octatonic and 7-21)
- several Z-related hexachord pairs are 'shared' between the 8-Z15/Z29 and Diatonic or Octatonic systems, e.g. pc set 6-Z13 is Octatonic whilst its Z-related partner 6-Z42 is Atonal
- there is a far larger number of different hexachords in the Atonal 8-Z15/Z29 system than in the table's only other 8-note system, the Octatonic (matching the

⁴¹5-21, 6-20 (the Hexatonic basis), 6-Z19, 6-Z44 and 7-21 are later associated through the related generative systems A, B and I (in Part C.5).

correspondingly larger number of tetrachord types in the atonal 6-Z19/Z44, 7-21 and 8-Z15/Z29 systems)

- although pc sets 7-21, 6-Z19 and 6-Z44 are contained within the larger Atonal system of 8-Z15/Z29, the other systems' 'mother-sets' are not, i.e. the Diatonic's 7-35, the Octatonic's 8-28, the Whole-tone's 6-35, the '6-7's 6-7, and the Hexatonic's 6-20
- all members of the Hexatonic and 6-Z19/Z44 systems are contained within the 7-21 system, bringing the Hexatonic and 7-21 close, in their disposition, to being atonal

Following on from the last point above, whilst pc set 7-21 relates to the Hexatonic mother-set 6-20, and to 6-Z19 and 6-Z44, being a super-set containing both, it is also itself contained within three inversionally-symmetrical 8-note sets, 8-7, 8-17 and 8-20, and within the asymmetrical 8-19 which is, however, the only 8-note subset of the sole 9-note TINV, 9-12. 7-21 and 8-19 provide the critical connection, then, between the related (by augmented triad formations) 6-20 and 9-12 TINVs, since they are the *only* 7 and 8-note links. The growth chain proceeds thus

- 6-20 (0,1,4,5,8,9)
- 7-21 (0,1,2,4,5,8,9)
- 8-19 (0,1,2,4,5,6,8,9)
- 9-12 (0,1,2,4,5,6,8,9,10)

7-21 and 8-19 can therefore be seen as *extensions* of the Hexatonic system (i.e. Hexatonic 6-20 plus either one or two extra notes) and at the same time as *subsets* of a related '9-12' system.⁴²

⁴²Similar generic correlations might be posited between the '6-7' TINV system and two 8-note 'systems' based on the TINVs 8-9 (complement to the TINV 4-9, the *Lulu* cell) and 8-25 (complement of the French sixth TINV, 4-25), and between the non-inversional TINV 6-30 and the TINV 8-28 (Octatonic) system (complement to the diminished seventh TINV, 4-28).

5. Generative networks of inclusion and complementation: an 'atonal' pitch-class set structural overview

To reaffirm an earlier assertion (at the end of Part C.3), that the tritone and the augmented triad are mutually exclusive components of some tetrachords, the same basic distinction might now be extended in order to categorise tendencies within larger sets. It has been suggested above that the commonly-found set 7-21 can form part of an abstract growth chain linking the hexatonic pc set 6-20 with the nine-note TINV 9-12. This generative chain of inclusion can be extended back to the source set 3-12 (the augmented triad, complement to 9-12), producing a sequence where sets are symmetrically complementary around 6-20 (while 6-20 complements itself). This chain appears as Sequence A in Table 5.3, which sets out this and eleven other sequences, some of which present alternative pathways of inclusion and/or parallel strands. These sequences offer an expansion to the types of set association so far posited, and allow access to some new analytical approaches; they also present the foundations for a new genealogical classification of pc sets based on aggregate systems and on familial likenesses among the full range of hexachords; this latter exploration appears towards the end of this section and in Section 6 of Chapter 6, where comparisons are also made with the existing genera systems of Allen Forte and Richard Parks.⁴³

Certain precepts common to all of the subsequent generative sequences can be observed in the first sequence:

- each sequence's progenitors are identified in its title, such as 3-12/6-20 in the case of Sequence A
- the progenitors tend to be the smallest pc set quoted (in this case, pc set 3-12, the augmented triad), but, equally importantly, each sequence's central hexachord or hexachords also act as principal determinants (in this case, pc set 6-20)

⁴³Allen Forte, 'Pitch-Class Set Genera and the Origin of Modern Harmonic Species', *Journal of Music Theory*, Vol. 32, No. 2 (1988), 187-271; Richard S. Parks, *The Music of Claude Debussy* (New Haven: Yale University Press, 1989).

- pc sets have been ranged symmetrically around the hexachord or hexachords, with all opposing pairs complementary within the twelve-note aggregate; the central hexachords complement themselves in the same way, while Z-related hexachords complement each other; the larger sets are intended to represent logical extensions of the defining six-note set or sets (in this case, 7-21, 8-19 and 9-12 are extensions of the hexatonic scale)
- all sets are subsets or supersets of all others linked to them by pathways of inclusion
- all pathways of inclusion on one side of the six-note set or sets are normally mirrored by the pathways on the other side; although the stated sets and pathways may not always be the only ones available, they do tend to provide the most logical chains of linkage between the principal generating sets according to defined criteria; in some cases the quoted sets are the only possible links, as for instance the 5-21 and 7-21 adjuncts to 6-20 in Sequence A
- an attempt has been made to limit the scope of each sequence to manageable and clearly circumscribed proportions

This first structural sequence contains 4-19, 5-21 and 7-21, sets which have already been shown to be of considerable significance in Opus 5. Members of the sequence can be seen in the 6-20/7-21 grouping of bar 2 of Piece No. 1 (the piano left-hand group F[#]-G-B^b-B-D-E^b-E) and in the 6-20 of bar 1 of Piece No. 4 (the opening chord C-D[#]-E-G-G[#], plus the clarinet B), shown in Example 5.21.

The next sequences illustrate two forms of expansion of Sequence A. In the first, Sequence A(2), the range of three and four-note sets has been extended into a more composite form of linkage. This variant of Sequence A treats the two major thirds of the initial augmented triad as separate entities, to be combined or dovetailed so as to create those members of the Hexatonic collection not previously included, i.e. (0,4) and (1,5) dovetail to make pc set 4-7 (0,1,4,5), (0,4) and (3,7) become 4-17 (0,3,4,7) and (0,4) and (5,9) convert to 4-20 (0,1,5,8). Sequence A(2)'s 8-note supersets, 8-7, 8-17 and 8-20, are the three symmetrical sets which contain 7-21 (see the penultimate paragraph of Part C.4.).

In the second expansion of Sequence A, Sequence B,⁴⁴ the six-note component has been modified to include the remaining five hexachords linking 5-21 and 7-21, including 6-Z19 and 6-Z44.⁴⁵ The two 'pure' hexatonic groupings from the opening of Piece 1 (bar 2) and Piece 4 (bars 1-3) are each modified in precisely this way, the first to 6-Z44, through a vertical overlap of sets (with a shared 5-21, and a 7-21 superset- Example 5.21), and the second to three alternative hexachords, 6-31, 6-Z44 and 6-Z19, through changes in the clarinet's contribution to the 6-note sonorities (first Bb, then A, and finally C#, while 5-21 remains constant in the piano: see Example 21).⁴⁶ The four hexachords 6-20, 6-Z19, 6-Z44 and 6-31 are also associated through close proximity in bars 1-3 of Piece No. 3- Example 5.21.

Sequences A, A(2) and B together form a complete subcomplex around 5-21. They include VI, 4-19a/b/c, 4-20 and 5-21 as cells and bonded five-note sets in Opus 5.

The hexachords most associated with the tritone are 6-7, 6-30 and 6-35, all of them TINVs containing three overlapping tritones. Each of the sequences centred on these hexachords (Sequences C, D and E) includes at least one of the transpositionally-invariant tritone-based tetrachords, 4-9, 4-25 and 4-28, and each presents part of a subcomplex based around its central hexachord.

The tritone/6-7-based generative sequence, Sequence C,⁴⁷ appears as a more composite 'family', with two elements each of cardinalities 3, 5, 7 and 9, and six each of cardinalities 4 and 8. Members of this structural sequence are, like A and B, found in bar 2 of *Piece No. 1*, this time in the form of the 5-7 phrase. The close juxtaposition of sets from these two

⁴⁴Naturally, the Hexatonic/6-20 Sequence A can be subsumed within this larger sequence.

⁴⁵Needless to say, this is not the only chain of inclusion sequence in which these hexachords might figure.

⁴⁶The opening notes of each of the clarinet semitonal descents at the start of this fourth piece, B and C#, are also associated with the piano chord on its return, in bars 11-12; these two pcs constitute both the conclusion of a central pedal within the wedge of bars 9-10, and the first two notes of the subsequent piano phrases of bars 12-16; Headlam (op. cit.) notes this correspondence on page 98; one can also observe the dyad C#-B in bars 15-16 of Piece No. 3 (clarinet), and the B-C#-D (of the piano phrases in bars 12-16 of Piece No. 4) in Piece No. 1 (bars 8-9, piano right hand) and in Piece No. 3 (at the summit of the clarinet's ascent, bars 12-13).

⁴⁷See footnote 42 of this chapter for 6-7's relationship to 8-9 and 8-25, both elements in this generic sequence.

sequential forms (i.e. 6-20/6-Z44 and 6-7) illustrates from the outset the fundamental opposition between tritone and augmented triad-based modes of pitch organisation (compare Examples 5.21 and 5.22). A similar opposition occurs at the end of the piece in bar 9, where the T-8 transposition of the *initial phrase*'s 6-Z44 is associated with pc sets 4-19, 5-21, 6-Z19 and 7-21, and is followed by Sequence C through several combinations of 5-7 and 4-5, representing a reprise of the 5-7 phrase and its characteristic 3-1 sub-cell Ia (Example 5.22). In both cases, a distinction can be noted between *surface* cell features (IIa, IIb, Xa, VIIa and Va in the 6-Z44/6-20 sets; Ia, Xa and the 4-5 and 4-16a cells in the 5-7s) and below-the-surface generative germinal sets (the augmented triad in the 6-Z44/6-20; the tritone in the 5-7). Sequence C includes Opus 5's cells I, IV, X, 4-5, 4-6, and 4-16a/b, the bonding tetrachord 4-8, and the bonded five-note cell, 5-7.

The second composite tritone-based sequence, Sequence D, centred on pc set 6-30,⁴⁸ incorporates all three 4-note TINVs, 4-9, 4-25 and 4-28. The fact that 4-9/8-9 and 4-25/8-25 appear in both Sequence C and Sequence D renders them 'invariant' as bonding elements between the sequences. The relationship between the 4-note TINVs can be expressed in terms of 6-30's three tritones, which are placed a semitone and a tone (and consequently a minor third) apart, corresponding to the intervallic separations between tritones in the three tetrachords- Example 5.23. Sets from Sequence D feature strongly in the *ostinato* figures of *Piece No. 3*'s middle section, bars 9-12, i.e. pc sets 3-5 (cell IVa, Example 7b), 3-8 (cell Xa, Example 5.5c), 4-28 (cell VIIb, Example 5.6c), 5-31 (Example 5.8d), 5-28, 6-30, 7-31 and 7-28; this passage's association with the sequence is anticipated by another member of the sequence, 4-25, which appears as the final piano sonority of the first section, in bars 7-8. Cells in Sequence D include VII, IV and X, and the bonded five-note cell 5-31.

Sequence E, the 6-35 (whole-tone), is generated from both the tritone (2-6) *and* the augmented triad (3-12). This sequence has cells X, VI and 4-21, and the bonding

⁴⁸Again, see footnote 42 of this chapter for 6-30's relationship to 8-28.

tetrachord 4-24; pc set 4-25 (the French sixth) appears for the third time as a sequence member.

It has been noted earlier in the chapter that Berg's Clarinet Pieces exemplify, to an unparalleled extent in his *oeuvre*, the prevailing aphoristic tendencies of Schoenberg and Webern, and make less use of features common in his immediately preceding atonal works, such as interval cycles, wedge formations, and discernible thematic and motivic associations. There is a similar paucity of transpositionally invariant sets, such as those which act as generating agents in Sequences A through to E; the pieces do nevertheless display many of the inclusion relations provided by these sequences. Sequences A, A(2), C, D and E, can also act as templates for other extended or modified chains, such as Sequence B. A vast array of modifications to these basic sequences could be made, but contextual parameters have deliberately been set to shape the next four sequences, F, G, H and I, to reflect some of the types of pitch association found in Opus 5.⁴⁹

Sequence F (a modification of the whole-tone Sequence E) consists of a more complexly-structured, tritone-based family, incorporating sets with a whole-tone-plus-foreign-note construction, a format commonly found in Berg's music of this period. The sequence contains a great deal of compositionally exposed cell and cell-bonded material, including the bonded pentad 5-34 (found in Pieces 2 and 3, using Sequence E's 4-21 and 4-24, Example 5.8c), and the tritonally-linked cyclic progression of 'referential pitch pair' tetrachords (4-5, 4-16, 4-Z15 and 4-Z19), a feature of bars 1-5 of Piece No. 1 (Example 5.16b). Cells IV and VII, and 4-27, 4-12 and 5-24 are other significant sets. Note also that pc sets 3-5, 4-5, 4-16 and 5-15 provide invariant links with Sequence C. Members of Sequence F feature at an early stage in the first piece (in the first half of bar 2), intersecting with the pc set 5-7 group, i.e. displaying 4-5, 4-16, 5-9, 5-13, 6-22 and 7-15- Example 5.24 (Pc set 5-34 is also present as notes 4, 5, 6, 7, 8 and 9 of the *initial phrase*).

⁴⁹For this reason Allen Forte has called the author's genera 'customised' (as opposed to Forte's own 'self-standing' genera system): CUMAC 97 'Round Table: Response and Discussion, Response by Allen Forte', *Music Analysis*, Vol. 17, No. 2 (1998), 227-236 (page 230).

Sequence G presents a refinement to the upper 'referential pitch pair' strand of Sequence F, involving a contrived modification from the whole-tone-plus-foreign-note orientation towards Opus 5's most significant hexachords, the related pair 6-Z19 and 6-Z44. This sequence is *not* subcomplex-based, and displays an unexpected distortion at its axis, where the two hexachords have a reciprocal relationship, each distributing to the complementary sets of its partner's subsets. The Z-designated five and seven-note sets are Z-related pairs. It is from this sequence that the larger segments of the *initial phrase* are aligned, i.e. pc sets 4-5, 6-Z44 and 8-Z29 (first piece, bar 1, Example 5.1a): a contextual distinction can be made between this 4-5/cell Xa-aligned statement of the *initial phrase* and the later reorderings at the start of Piece No. 2 (still Sequence G, but with 4-16, 5-20, 5-Z18 and 6-Z19 elements within an untransposed reordering of the *initial phrase*'s 8-Z29- see Example 5.33), at the start of Pieces 3 and 4 (now conforming to Sequence B in their 4-19 and 5-21 inclusive within 6-Z44- see Example 5.21), and at the end of Piece No. 4 (Example 5.2d). In the First Piece, elements of Sequence G first recur in the first part of bar 3 (the clarinet's notes, superimposed onto piano note F from the pc set 6-7 (which is a Sequence C grouping, in the instrument's middle *tessitura*)- Example 5.25. Sequence G cells and cell-bonds are IV, 4-5, 4-16, 4-Z15, 5-20 (the pentad most connected to other bonded pentads by 'common' tetrachords) and 5-Z38.

Since the whole-tone E sequence can generate the tritone-based F, it follows that it can also generate the somewhat different whole-tone-plus-foreign-note, Sequence H, emanating from the augmented triad, although this grouping naturally has an affinity, through its sets of cardinalities 5, 6 and 7, with the other whole-tone-plus-foreign-note sequence; elements from the two sequences intersect at the same early point in the first piece, at the start of bar 2. This latest sequence reappears in bars 8-9, at the end of the development section, in the pc set 9-12 grouping which holds 8-19/7-26/6-34 and 8-24/7-13/6-22 (Example 5.26). Sequence H cells are VI and 4-19.

A second 'atonal' sequence, Sequence I, generates from 3-12 in the same way, but with a bias to 6-Z19/6-Z44. Following the precedent of G, it modifies H in order to centre on 6-

Z44 and 6-Z19: once again, the reciprocal distribution of inclusion relations crosses over at the two hexachords, as it did in Sequence G, suggesting that in this Z-related pair, at least, there is a special relationship other than that of interval vector equivalence. Sequence I also relates directly back to Sequence B, extending that sequence's cardinal five content to include all of the sets containing 4-19. Sequence I can be further extended to include the rest of Sequence A/B's 6-note sets, as supersets of 5-21. Once again, the Z-designated sets are Z-related pairs. This sequence's similarity to Sequences A and B (the 'Hexatonic' and 'Modified Hexatonic') is immediately obvious, the three being components of a larger 3-12/4-19-based set complex.⁵⁰ As might be expected, groupings displaying membership of Sequences A, B and I can be found in close proximity in the music; this collation occurs in considerable abundance in the first piece during bars 6-8 (shown in Example 5.30), while members of Sequence I first occur in bar 3, linked to a 6-20 (Sequence A) grouping (Example 5.27).

Yet further genetic hybrids might be formed, through crossovers effected by common elements between sequences, such as can be observed with pc sets 4-5 and 4-16 in

⁵⁰The term 'set complex' can be understood to represent a collection embracing all sets associated together through inclusion and/or a 'reciprocal complement relation' (A. Forte, *The Structure of Atonal Music*, op. cit., pages 93-97). The present generative chains of inclusion tend towards a more limited scope of membership than set complexes, but have a more flexible response in allowing individual sets to be (contextually) members of more than one genus, and are deliberately biased towards the orientations of pitch organisation found in Opus 5. There are, however, strong similarities between this work's prime generative links and those found in *Wozzeck*. Schmalfeldt (page 230) proposes a 'family of origin' chain of inclusion embracing the principal groupings representing the character of *Wozzeck*, comprising pc sets 4-19<5-26/5-30<6-34<8-24, which resembles in its incremental nature this study's generative chains, most specifically the augmented triad-based whole-tone-plus-foreign-note Sequence H (Headlam records the whole-tone-plus association, op. cit., page 62, but not the augmented triad basis): in *Wozzeck*, 4-19 is notable as the 'Wir arme Leut!' motive, as the 'fixed harmony' of the Act II Interval between Scenes 2 and 3 (Jarman, page 56), and as Perle's cells A and D from Act II, Scene 1 (Perle pages 146-148); 5-26 is Perle's 'pentad X' from Act II, Scene 1 (Perle, pages 150-155); 5-30 is the second chord of the opera, which Jarman identifies with *Wozzeck* (Jarman, page 66); 6-34 is Perle's 'principal referential chord' (Perle, *Serial Composition and Atonality* (Faber, 1962 and 1968), pages 208-210) and Jarman's 'Cadential Chord B' (Jarman, page 49). Other groupings associated with both *Wozzeck* and *Marie* are members of the Sequences A/B/I complex: 5-21, 5-22, Perle's basic pentad of Act II, Scene 1 (Perle, pages 147-153), 6-Z19 and 6-Z44, Perle's hexads B and A (Perle, pages 148-149) and Schmalfeldt's 'binding' hexachords (Schmalfeldt, page 238), 6-31, Jarman's 'Cadential Chord A' (Jarman, page 47), and 7-21, Jarman's Cadential Chord A1 (Jarman, pages 60-61). Whereas all of the sets, cells, chords, etc. associated with *Wozzeck* belong to these two augmented triad-based genera, those others associated with *Marie* (Schmalfeldt, page 231) belong to a wider variety of Sequences (but not the augmented triad-based ones), i.e. pc sets 4-17 (the major/minor chord), 4-18 (Perle's cell B), 4-20 (Perle's cell C), 4-16, 4-23, 4-27 and 5-20, the first chord of the opera (Jarman, page 66) (Headlam, true to his even cycle/odd cycle dichotomy, assigns *Marie*'s sets to the interval-5 cycle, op. cit., page 62). Page numbers in this footnote refer to D. Jarman, *The Music of Alban Berg*, op. cit., G. Perle, *The Operas of Alban Berg: Wozzeck*, op. cit., and J. Schmalfeldt, *Berg's Wozzeck: Harmonic Language and Dramatic Design* (Yale, 1983).

Sequences C, F and G or pc set 3-10 in Sequences D and F; similarly, elements of the whole-tone E might be conjoined with elements from F or H, in order to reflect transformations between pure and impure whole-tone groups.

It can be perceived from the above paragraphs that, with the exception of Sequence D and the whole-tone Sequence E, a network encompassing *all* of the generative sequences so far posited are featured during bars 1-3 of *Piece No. 1*. Bar 4 continues the trend, with Sequence I members in the piano's treble (the notes F-G#-Bb-A form pc set 5-Z37, while the latter three notes link with the clarinet's F-D to form pc set 5-21). Sequences C and F are also featured, particularly through the latter sequence's 4-16b and IVa-based quartal harmonies in the piano's left hand (Examples 5.28 and 5.12b). Bar 5 is dominated by Sequence F, and incorporates cell Xa in the 'tenor' line (originally a Sequences G and C element in bars 1 and 2)- see Example 5.29.

It has already been mentioned that the first piece's 'development' section has an even stronger bias towards those sequences containing the 4-19 tetrachord, i.e. Sequences A, B, H and I, with the section starting and ending with elements from the whole-tone-plus foreign-note H. The collections and their pc sets are shown in Examples 5.30, 5.6b and 5.8f.

The recapitulatory material of bar 9, i.e. the reprise of the *initial phrase's* first six notes (6-Z44) and of the piano's initial 5-7 of bar 2, is remarkable in that it is presented in a vertical as well as linear form, with a simultaneous dimension that was not a feature when the 'themes' were first stated. The intersecting sequences (Sequences B, C and I) are displayed in Examples 5.22 and 5.31, together with the cells and pc sets involved.

The Coda's sustained sonority (pc set 9-6), together with the added low B in the final bar, has most affinity with Sequence C: Example 5.32a shows its constituent pc set segments: five stacked 3-5s (four of them cell IVa), 4-5, 4-6 (including the cell shape), 4-8, 4-16 (including two of the cell 4-16b), 5-7, 5-15, 7-7 and 8-6; Example 5.32b shows alternative

sequence elements. The Sequence C disposition resembles an earlier point in the music, at bar 4, where two of the three central chords share the same quartal cells 4-16b and IVa.

Two final generative sequences incorporate pc set correspondences found extensively in the final three pieces.

The *second piece* starts with adjacent elements from Sequences G and F (Example 5.33), and then moves into a series of chords (in bar 5) where some octatonic groupings seem also to be suggested. Although Sequence D is selectively octatonic, an almost fully-octatonic generative sequence, Sequence J, is more specific to these bar 5 chords. The sequence's linear sub-sequences a), b), c) and d) have been arranged for convenience and ease of viewing, but each reflects a distinct strand of inclusion relations:

- Ja) repeats Sequence D
- Jb) modifies this sequence, replacing the three invariant tetrachords with 4-Z15 and 4-Z29- these Z-related tetrachords represent 'mutant' 4-9s, 4-25s or 4-28s in this context; elements of Jb) occur in the first piece in bar 5, incorporated within a Sequence F context
- Jc) and d) bring together those octatonic elements derived from pc set 2-3, the minor third

Sequence J offers a different form of structuring, excluding components above cardinal seven. Unlike previous sequences, correspondences here are symmetrically placed around the tetrachord content. This new type of arrangement is possible because *all* octatonic pc sets have *just one* complement within the 8-28 aggregate; smaller complements are shown in parentheses after each larger set.

Those octatonic complementary pairs missing from the sequence are

6-Z13/2-1

6-Z23/2-2

6Z49/2-4

6-Z50/2-5

Tetrachords now behave in the same way that hexachords behave within the 12-note aggregate: all tetrachords are self-complementary, excepting 4-Z15 and 4-Z29, which complement each other. Sequence J includes cells VII and 4-Z15, and the bonded pentad 5-31:

Example 5.34 shows that the chords of bar 5 follow the succession 5-34 (from Sequence F; a vertical cell shape, and itself containing the 4-27 cell), 5-29 (diatonic K, see below), 5-25 (J/diatonic K), 4Z15 (J/F), 5-26 (F), 4-16 (F/diatonic K), 5-32 (J);⁵¹ in addition, pairs of chords together create a succession of 8-note groupings using 8-Z15 (J/F), 8-Z29 (J/F) and 8-16 (F); Sequence J is also anticipated in the 7-25 of bar 4. All 5-note chords except one have pc set 4-27 as their upper four notes, the binding set across Sequences F, J and K, while the *lower* four notes of the fifth chord also form 4-27, an inverted form of the last of the 'upper' 4-27s, and therefore a cell shape tetrachord; in addition, the 'upper voice' notes of chords 2, 3, 4 and 5 (i.e. Eb-Bb-C#-G) also spell out 4-27.

The full imbrication of larger chords and phrases can often reveal the presence of a composite or transformational range of sequence members. The ten-note chord at the end of the first piece, shown twice in Example 5.32, appears primarily to follow Sequence C (on the left of the example, with pc sets 3-5, 4-5, 4-6, 4-8, 4-16, 5-7, 5-15 and 7-7 present), but the chord, as imbricated on the right of the example, also contains components from Sequences B and I, from E, F and H, and from G and diatonic K. Now, in the second piece,

⁵¹Headlam refers to this pc set 5-32 occurrence as being a subset of 6-Z44 (op. cit., page 96), although in context the present analysis places the chord as a Sequence J octatonic member.

the clarinet phrases of bars 5-7 reflect the Sequence F and diatonic K elements noted in the piano chords of the same bars (Example 5.34): the clarinet's Eb-Cb-Bb-Gb-Fb-Db-Cb-Bbb-Ab-G (pc set 9-7), shown in Example 5.35, has overlapping 5-20 (G/diatonic K), 5-29 (diatonic K), 5-9 (F), 4-16 (F/G/diatonic K), 4-22 (diatonic K) and 4-11 (diatonic K) segments. The sets labelled K, including the 9-7 and the piano's 4-27, are members of 'diatonic' Sequence K chains of inclusion.

This final sequence brings together the diatonic subsets of pc set 8-23. Elements from this sequence frequently occur in Opus 5 in conjunction with those from Sequences F and J, as, for instance, during the second piece's series of chords in bar 5, shown in Example 5.34. (The whole series of chords has also been interpreted diatonically as a prolonged dominant-to-tonic cadence in Db, where most of the chords contain a pc set 3-8 formation of minor seventh in the bass plus tritone above, another quasi-dominant seventh formation—see Example 5.17.) Sequence K's included cells are IX, V, VIII, 4-27, 4-22 and 4-11; bonded pentads are 5-24 and 5-27.

The 4-22 and 4-11 diatonic elements are again a feature of the continuation of the clarinet part into bars 6-7 of this second piece (as segments of a larger diatonic 5-23, A-G#-F#-E-B), while concurrently the two conclusive cadential chords onto Db are sounded in the piano (i.e. the V7-I of Example 5.17). The first of these chords (C-Gb-C-Eb-G, pc set 4-18) is a 'new' harmony constructed from parts of two previous ones, the lower two notes from the 4-16 chord (C-Gb) and the upper three notes from the 5-26 chord (C-Eb-G). The concluding Db-based chord is a reiteration of bar 5's final chord, 5-32. Both chords have pc set 4-18 as their upper four notes (from octatonic Sequence J), but of more specific importance to the function of the cadence are the three upper notes of each chord *together*, which form pc set 6-20, the hexatonic scale collection: these upper three-note segments are each common triads (pc set 3-11), of C minor and E major respectively, contributing to a complex Ab/Cm to Db/E progression. Such bitonal harmonies were commonly found in the Opus 2 songs (as in the fourth song chords shown in Example 2.5a); here, the C minor triad acts in a flattened-submediant relationship to the E major triad (in the 'late-romantic'

manner recently explored by Cohn⁵²), yet at the same time they are integral parts of the compound Ab and Db chords themselves. The 6-20 grouping also functions as a presage for the piece's final augmented triad (cell VIa) sonority.

Piece No. 3 opens by taking up the previous piece's final VIa cell, and generating from it its own Sequence A(2)/B/I members, 3-12, 4-19, 4-17 and 5-21, with a reordered and transposed version of the *initial phrase's* 6-Z44 (Examples 5.1c and 5.8f), although the 8-Z29 and 4-5 are Sequence G or F; there then follow elements of the octatonic Sequence J in the clarinet phrase of bars 1-3 (Example 5.36), and Sequence B in the piano's accompanying succession of three-note chords (Example 5.21). The succeeding 'transformation pattern' progression of three chords in bars 3-5 (Example 5.37) all contain cell shapes, an almost-whole-tone 6-34 (with cells 5-34/4-21/4-27), the 7ths/quartal 5-5 (with cells IVa/4-6) and 4-19 (itself a cell, 4-19b); the progression is generically transformational from a Sequence F chord (tritone-based whole-tone-plus-foreign-note, with the whole-tone Sequence E as a basis) to one with Sequence C elements (tritone-based), and then back to the piano's earlier disposition, an augmented triad-based Sequence B/I chord (or quasi-tonal 3-11-based K in this context, since the fifth B-F# is doubled in the bass). Meantime, the clarinet continues (bar 5) with a diatonic phrase (comprising the Sequence K pc set 5-20, and containing cell 4-16a (Example 5.8a), dissociated from its pc set 5-7/Sequence C context). The ensuing chords of bars 6-8 comprise the progression 4-19, 4-24, 3-12, 4-20 (linking with treble notes to form 5-21) and 4-25, i.e. members of A/B/I or E (all augmented triad-based except the final 4-25, which represents a move away to a tritone base).

Although there is no direct link between the pitches of bar 8 and those of the next section (the whole of which is shown in Example 5.39), the *ostinato* figures of bars 9-11 take up the overlapping tritone content of the bar 8 French sixth (4-25) and reinterpret it as tritones overlapping by minor thirds, forming diminished seventh groupings (4-28), for the basis of

⁵²Richard Cohn, 'Maximally Smooth Cycles, Hexatonic Systems, and the Analysis of Late-Romantic Triadic Progressions', *Music Analysis*, Vol. 15, No. 1 (1996), 9-40.

this passage, i.e. of B-D-F-Ab (in the piano and clarinet) and G-Bb-C#-E (in the bass and treble *tessiturae* of the piano). The generative sequences are D and J (with cell Xa prominent), although the opening of the piano's *ostinato* relates to the 'atonal' G and I sequences, with cells 4-16b and 1Va reinterpreted to Sequence G from their previous Sequence F and C contexts, and the section closes (in bar 12) with elements from E/F in the clarinet⁵³ and, again, the 'atonal' G and I in the piano; the final sonority of the section (7-21, with 6-16 as the piano content, bar 13) is taken from Sequences B/I and K, but with strong reminiscences of other material as well, i.e. in the prominence given to cells IVa and 4-16b from the Sequence G content of the section's opening (referring also to the Sequence C content of the first piece's closing sonority- Examples 5.8a and 5.32 shows these), and in a resemblance to the 6-34 chord of bar 3 (which was Sequence F, but with the same *tessitura* as the piano chord).

Generative sequence analysis can throw some light on the essence of reprise in the final section (there is otherwise, seemingly, only a return to the general spirit of the opening eight bars). The two areas used are Sequence C (5-7, 4-6 and 4-5, the latter replicating Piece No. 1's first four pitches) and Sequence E (6-35, the first complete whole-tone scale)- Example 5.40; see also Examples 5.2c and 5.8e. Sequence C relates specifically to the central transformation pattern chord of bar 4, and also, by its association with the bar 2 5-7 phrase of Piece No. 1, to the 4-16 component of the clarinet phrase of bar 5 of this third piece. The suggested projection of 6-Z44 and 8-Z29 onto this final section (see Examples 5.2c and 5.40) introduces Sequence G to the arena, a sequence previously associated with the opening of both of the other sections, in bars 1 and 9, and with the opening of Pieces 1 and 2 (the latter shown in Example 5.33).

The *fourth piece* introduces no new generic forms. The first four bars' adherence to Sequences A, A(2) and B has already been noted (Example 5.21). The contrapuntal cell-based passage that follows in bars 5-6 (Example 5.15) uses elements from Sequence C (3-

⁵³Note that cell Xa, which was Sequence C/K in bar 5 and Sequence D/J in bar 9, is now Sequence F.

5/cell IVc, 4-5, 4-6, 4-Z15, and 5-7; 5-6 and 6-5 are related forms through their 4-5 and 4-8 content, and 5-6's inclusion in 6-7).

In bar 7, the lateral segmental content tends towards a juxtaposition of three areas, Sequences F, E and K, which continues uninterrupted until bar 10 (Example 5.41).⁵⁴ Sequence E (the whole-tone) underpins the piano's wedge sequence passage of bars 9-10. Sequence K (the diatonic) is represented by pc sets 4-11, 4-22 and 4-23, in bar 8, where the series of chords suggests 'dominant' ninths on D (4-11), on F (4-22), on E (4-22), on A (4-18, a non-Sequence K set) and on D (a rootless thirteenth, 4-23); the 4-23 and 4-18 components of the series are then reiterated over a G-Bb pedal in the clarinet (suggesting a superimposed II9-V13-I in G minor?), while bar 9's 4-23 to 4-25 progression suggests a thirteenth on D followed by a French sixth representing V7 on G. This tentatively implied G as a focal centre is supported by the diatonic start to the bar 9 clarinet phrase (using 4-23, 4-11 and 4-22 from Sequence K) and by the same instrument's subsequent wedge formation centred on G; the suggested French sixth V7 on G is vindicated in the long-term by its ultimate 'resolution' onto the C-based *ritornello* chord in bar 11.

The *ritornello*'s arrival marks a brief return to the augmented triad-based Sequence B. Following this, the expanding eight-note piano phrase of bars 13-16 has an augmented triad as a melodic component, acting as the crux to elements from three overlapping generative sequences (Example 5.42): the first six notes of the eight-note phrase are Sequence I (with 6-14 as the hexachord), while the final seven notes also contain elements from Sequence F (with 6-34 as the nearly-whole-tone hexachord);⁵⁵ since the full eight-note set, 8-11, is a member of yet another genus, the 'diatonic' Sequence K, a bitonal split could also be suggested, with the opening 5-Z17 (B-C#-D-Bb-F#, also designated Sequence I) having a D major/minor aspect and the overlapping final tetrachord 4-27 (F#-Eb-Ab-C, also designated Sequence F) being a dominant seventh on Ab, D's tritonal

⁵⁴The bars 9-10 clarinet phrase in Example 5.41 also contains pc set segments 9-8 (Sequence E), 8-Z15 (F), 8-25 (E), 7-30 (F) and 7-13 (F).

⁵⁵Incidentally, the same 6-34 occurs in the clarinet in bar 9- see Example 5.41.

partner. This tritonal relationship *reverses* the Ab to D dichotomy present in the *initial phrase* of Piece No. 1 (Example 5.16c).

The climax of bars 16-17 precipitates a change in the final four bars, producing two strongly diatonic Sequence K chords in the piano, both rooted on C, and a generically unclassified hexachord, pc set 6-2, in the clarinet.⁵⁶ This final clarinet phrase is, however, inextricably linked with the C-E-G-B piano chord. Both components have a sum 11 inversional symmetry,⁵⁷ and together they produce a variety of Sequence B and A(2) sets (with a *different* Sequence B hexachord, 6-16, at their heart), linking this conclusion to the opening of the piece, and to strategic occurrences of Sequence B elsewhere- Example 5.43. Moreover, the central pc set/shape cell 4-5 segment of the clarinet phrase (incorporating cells Ia and Xa, but now dissociated from its original Sequence C context of Piece No. 1, bar 2), if combined with the major third C-E component of the piano chord, forms the *initial phrase's* pc set 6-Z44, untransposed and therefore suggesting Sequence G, paralleling also the similarly-constructed 6-Z44 at the end of the third piece.

The presence of pc set 6-16 in these final bars confirms a special significance accorded this Sequence B/I hexachord: it has previously appeared at certain strategic points, as a component segment of the first piece's final chord (the notes F#-F-Bb-E-A-D) and likewise of the third piece's bar 13 pause chord (the piano's notes, F#-B-F-Bb-Eb-G). Headlam's discussion of pc sets 6-16 and 6-20 as supersets of 5-21 in Opus 2 No. 4 does not reappear during his analysis of the occurrences of pc sets 6-16 and 6-Z44, another superset of 5-21, in Opus 5;⁵⁸ these relationships, and their association with pc set 7-21 and other related hexachords, have already been shown in this section, in the part relating to Generative Sequences A and B. In his persistent search for 6-Z44s throughout Opus 5 (pages 96-99 and page 186), Headlam frequently records them as subsets of a 7-21 or supersets of a 5-21, while neglecting to document the more obvious sets present, such as the 6-16 piano segment in Piece No. 3, bar 13.

⁵⁶Although this pc set 6-2 phrase *does* contain the Sequence C/F/G cell 4-5.

⁵⁷Noted by Headlam, op. cit., page 99.

⁵⁸Op. cit., pages 172, 96-99 and 186.

Headlam's instances of 6-Z44 are:

- the bar 6 pc set 7-22 chord in Piece No. 1 with an upper 6-Z44 segment, which Headlam identifies as a SCHBEG motto (page 186); however, this 6-Z44 is followed by further Sequence B/I hexachord segments in the other two seven-note chords of bar 6: 6-14, 6-16 and 6-Z19 (see Example 5.30)
- a bar 7 pc set 6-Z44 SCHBEG motto in Piece No. 1; however, in the present analysis this forms part of a Sequence A/B/I pc set 9-12, with 6-31 and 6-16 segments, Example 5.30
- a non-contiguous 6-Z44 group extracted from the final chord of Piece No. 1, on the strength that five of its notes are invariant with the piano pc set 5-21, F#-G-Bb-B-D, from bar 2 of the same piece; Headlam fails to record that a pc set 7-21 complex in bar 2 contains not just his 5-21, but a clear 6-Z44 grouping as well (see Example 5.22)
- the bars 11-12 pc set 7-21 in Piece No. 4; his 6-Z44 component here, E/G/G#/B/C/C#, significantly forms an invariant link with the 6-Z44 at the start of Piece No. 3
- the bass notes Eb-Ab-C-A-B-C-E-G pc set 7-21 in bars 13-17 of Piece No. 4, which contains 6-Z44 when the B is discounted; the present analysis includes these notes within a larger 8-17 group, Example 5.43
- the bars 18-19 G#-A-G-Eb (clarinet) plus C-E-G-B (piano) pc set 7-21 in Piece No. 4, which contains 6-Z44 when, once again, the B is omitted; again, this 7-21, invariant with the one above, forms part of the larger 8-17, Example 5.43

More apposite among Headlam's instances are:

- the bars 4-6 clarinet pc set 6-Z44 in Piece No. 1 (page 186), which this analysis records as a subset of 7-21 with 5-21, 4-19 and 4-17 segments (Example 5.30)
- the bars 6-8 pc set 6-Z44 in the piano's bass, Piece No. 1 (page 186)

The 6-16s in bar 19 of piece No. 4, noted by Headlam on page 98, are each part of a larger 8-17 and 8-7 in the present analysis, Example 5.43

A summary of the generic sequence occurrences in all four pieces is given in Table 5.4.

This summary confirms certain proximal associations raised earlier, i.e. Sequences A, B, I and A2 as an inclusive 'super-sequence', Sequences C, F, G and J as allied through pc sets

4-5/4-16 and/or 4Z15/4Z29/8-Z15/8Z29, Sequences A/B/I and G forming an alliance through their ability to encompass the complementary hexachords 6-Z19 and 6-Z44, as in the *initial phrase*, and Sequences C and D through their inclusion of the TINV tetrachords, 4-9, 4-25 and 4-28. In general, each piece's middle section provides a contrast to its outer sections, while Sequences G and B (containing the initial phrase sets 6-Z44 and 8-Z29) and the contrasting Sequence C (containing 5-7 and cells IV, 4-5 and 4-16) are the sequences most commonly found at the start or end of a piece; in this latter respect, however, Piece No. 2 is exceptional, with no Sequence C tritone-based elements and no sets from 3-12/4-19-based sequences apart from the bar 6 6-20 and the final augmented triad. The summary also confirms that Sequence D (the 6-30-based) is associated exclusively with Piece No.3.

A distinction can be made, in a few cases, between melodic and harmonic content. Sequence H (the augmented triad-based whole-tone-plus-foreign-note) occurs only harmonically in Piece No. 1 (in bars 6, 8 and 9- see Examples 5.26 and 5.30). Piece No. 1 is also distinctive in its melodic use of the Hexatonic sequences, A and A2 (bars 5-6, Examples 5.29 and 5.30), while Piece No. 4 is distinctive harmonically in its use of diatonic (Sequence K) chords (in bars 8 and 18-19, Examples 5.41 and 5.43).

Table 5.5 shows a network of associations, and reveals that each piece has its own exclusive circle of correlation:

- A/A(2)/B, H and I in Piece No. 1, all holding 4-19 in common, together in bars 2-3 and bar 9, and F and H in the same piece, sharing whole-tone-plus-foreign-note configurations
- F, G, J and K in Piece No. 2, the first three of which contain 4-Z15/Z29 and 8-Z15/Z29, found together in bar 5 (F and G are also together in bars 1-4)
- G and I in the third piece, holding pc sets 5-20, 4-16 and 3-5, together at the start and end of the middle section, bars 9-13
- I, F and K together, and E, F and K together, in Piece No. 4, I, F and K including 4-19 in their sequence, occurring in bars 13-16, and E, F and K being 'nearly-whole-tone', appearing in bars 7-10

A feature of several of the sequence modifications has been an extension of the cardinal six component, i.e. of the 6-20 element of Sequence A to include five other hexachords in Sequences B and I, of the 6-35 element of Sequence E to include the three whole-tone-plus hexachords in Sequences F and H, and of the 6-30 element of Sequence D to include one other hexachord in Sequence J. The hexachords in the case of Sequences B and I all contain 5-21, and are therefore equivalent modifications of 6-20 with five pitches invariant; those in Sequences F and H each contain 5-33, the whole-tone pentad, and therefore analogous modifications of 6-35, again with five pitches invariant, and the new hexachord in Sequence J contains 5-31, and is therefore a close modification of 6-30 with five pitches invariant.

It is possible to categorise *all* hexachords in this way, so that derived sets are minimal modifications of symmetrically or transpositionally invariant 'mother' sets. The resultant families are set out in Table 5.6. All 'mother' sets are transpositionally invariant except 6-32, and all are inversionally symmetrical except 6-30. In all cases a family member's equivalence is arrived at through the dislocation of one pitch numeral to the left or right of its original position in the 'mother' set's prime form; these movements are indicated by a plus or minus numeral in parentheses, and are the equivalent of a transposition of that pitch element by that number of semitones. The table places all Z-related hexachords together in pairs, and reveals that in every case each pair requires the *same* movement of one element in order to match the 'mother' set. This property, of the Z-related pair to another set, suggests a different Z-correlation to the customary ones of complementation and identical interval vector.

Those hexachords and Z-related pairs which are exclusive to just one family are underlined in the table. The pentad to the right of each hexachord identifies the subset held in common with the 'mother' set. It can be seen that these five-note sets match the five-note elements contained within the corresponding generative sequences: 5-21 in the case of the 6-20-based Sequences A and B, 5-7 and 5-15 in the 6-7-based Sequence C, 5-19, 5-28 and

5-31 in the 6-30-based Sequence D, 5-33 in the whole-tone Sequence E, and 5-23, 5-27 and 5-35 in the diatonic Sequence K: these sequence titles head each family column. Since 6-20, 6-30 and 6-35 have already been expanded into new sequences (i.e. Sequences I, J, F and H), it follows that 6-7 and 6-32 can be, too.

6-7-related hexachords are particularly commonly found in the *first piece*, with several instances of pc sets 6-18, 6-Z43, 6-Z12, 6-Z38, 6-Z17 and 6-Z41, all backed up by attendant 3, 4 and 5-note sets from Sequence C (i.e. 3-5, 3-8, 4-5, 4-6, 4-8, 4-16, 5-7 and 5-15). The fact that these hexachords occur during bars 1-5 and 8-12 provides further credence to the structural division of the piece into outer sections based on Sequence C, D, E, F and G elements, deriving ultimately from the tritone, and a central section based on Sequence A, B, H and I elements, deriving from the augmented triad.

Chapter 6

Conclusion: towards a codification of pitch organisation in the early atonal works of Alban Berg

The seven sections of this concluding chapter provide a review, and in some cases a further development, of those pitch organisational notions presented during Chapters 2-5 as having significance in Berg's Opus 2/4, Opus 3, Opus 4 and Opus 5; these notions include

- the works' common (or differing) motivic/cell-shape structures, their invariant pitch groupings/focal pitches and their symmetrical/cyclic structures
- an overview of the interconnectivity of several suggested forms of categorisation, binding the intercorrelation of motives, the superimposition of cyclic patterns and the modification of aggregate inversional matrices
- a comparison between the earlier 'atonal' pitch organisational procedures and Berg's later pre-serial and serial techniques
- an evaluation of the other extant systems of pitch-class set genera, leading to an expansion to the categories of generative sequence outlined in Part C.5 of Chapter 5, and
- a final consideration of the extent to which the varying forms and degrees of pitch organisation in Berg's earlier works can be termed 'codifiable'

1

Some organisational aspects of Berg's Opus 2-5, while ostensibly reflexively-relevant within each individual work or piece, nevertheless prove to provide stylistic and pitch-related links between works, through motivic and cell-shape connections, similarities between invariant pitch groupings, and shared focal pitches. Many motivic cell types tend towards the contextually-normative, being part of the expressive syntax of the Second

Viennese School during the period under discussion; there are likewise many instances of cell-like recurrence among this particular sequence of Berg's works.

Example 6.1a shows significant similarities between passages in the fourth Opus 2 song, the first movement of the String Quartet, and the second *Altenberg* song, all of which incorporate alternating minor thirds and semitones in a hexatonic overlapping of pc sets 4-7 and 4-17. Example 6.1b shows various recurrent three-note chord/motivic types (pc sets 3-5, 3-8, 3-4, 3-2 and 3-7) and some multi-note triadic derivatives, many of the latter occurring in Opus 5. Example 6.1c focuses on the pc set 3-1 cell-shape (1^2) which plays a significant role in three of the works, in the first movement of the String Quartet (as the start of the bars 3-6 wedge formation and in motive *b4*), in the first and fifth *Altenberglieder* (as the opening notes of motive δ , again the start of a wedge, and as motive II, trumpet, at the start of song 1), and in the first and fourth of the Clarinet Pieces (as cell Ia).

Another pervasive cell-shape (1-3) is shown in Example 6.1d, formed from pc set 3-3 and prominent as motive *a3* in the String Quartet's first movement, as notes 2, 3 and 4 of the four-note motive VII from the first *Altenberg* song, and as cell IIIb in the first Clarinet Piece.¹ Example 6.1e shows a further melodic shape fragment comprising perfect fourth plus semitone (5-1), which appears in the first movement of the String Quartet (part of motive *b3*), and in the *Altenberglieder* in the versions of motive ϵ found in Songs 2 and 4; extensions of the (5-1) cell give a (5-1-5) pc set 4-9 formation found in the second *Altenberg* song (bar 2, voice) and a (5-5-1) pc set 4-6 shape found in the String Quartet's second movement sextuplet motive. Fourth's cycle segments, shown in Example 6.1f, characterise *a1* from Opus 3/1, the sextuplet motive from Opus 3/2, and α from Opus 4. Finally, pc sets 3-5/4-3/4-17 ($4^1 4$) segments, shown in Example 6.1g, feature prominently in several places, as octatonically-oriented groupings in Opus 2/4, bars 12-14, in Opus 4's δ and ϵ themes, as the prevalent basis for the octatonically-organised outer sections of Opus 4/2, and in more isolated instances in Opus 5/2 (bar 4, the piano's D-F# to

¹This cell-shape also spawns the 4-7/4-17 figures mentioned above.

F-A), Opus 5/3 (bars 1-2, clarinet) and Opus 5/4 (bars 5-9, clarinet and piano, and 13-16, the piano's C#-D-Bb).

The tritone in descending form seems also to have a special motivic significance, particularly in the earlier works: it appears prominently in Opus 2, No. 4 at bars 6-7 (Eb-A), bars 10-11 (C#-G and F#-C), bar 17 (Bb-E and Gb-C), and bar 24 (the bass F-B); in Opus 3/1 it features as the outer notes of the *head* motive (initially F-B), and occurs in *a*2 (G-C#), in *b*2 (Bb-Fb), in *b*3 (B-F, G-C#, F#-C), and in the extended *a*3 (G-C#); in Opus 3/2 it is found in the *marcato* theme (Ab-D and G-C#) and in the anticipatory variant (Eb-A and G-C#), in the lyrical theme (Bb-E), and in the G-C# 'motive', first heard in bar 34 and ultimately a dominant feature in the bass in bars 175-178 and in the sixteen-bar coda; in Opus 4 it figures in motives IV (D-Ab and G-C#) and IX (F-B), and it is present in Opus 5 as a component of cells IV and X.

Invariant pitch groupings common to more than one work are rarer, but include: the tritone F-B, found in Opus 3/1 as the boundary notes of the *head* motive, and in Opus 4/1 as a component of motives I/VI, V, IX and γ ;² the pc set 4-9 Ab-D-G-C#, a determining factor in Opus 3/2's *marcato* theme (and C#-G in the *coda*), and in Opus 4's δ , α and IV motives; the pc set 3-3 C#-D-F which appears in Opus 3/1 as an *a*3 cell (e.g. in bars 13, 16, 25 and 30), in Opus 4/2 (bars 2-3, as D-C#-E#, and bars 8-9, as D-Db-F), and in Opus 5/1 as a common component during bars 3-5; a related pc set 4-7 A-Bb-C#-D present in the Opus 3/2 *ritornello*, and in bars 3-5 of Opus 5/1; the pc set 3-8 Eb-G-A, which occurs in Opus 3/1 as a component of *a*2, in Opus 3/2's anticipatory variant, and in Opus 5's *initial phrase*.

The principal commonly-held focal pitches are D, G and C: Opus 2/1 has D as a tonic, and D returns as a subsidiary 'key' in Opus 2/3; Opus 2/4 has C and G-based chords in bars 1-11, and a return to C as a bass note in bars 15 and 17; Opus 3/2 has a D/G dichotomy

²F-B reappears as a significant focal element in *Wozzeck*, most notably as a primary component of the principal referential chord, Jarman's 'Cadential chord B' (D. Jarman, *The Music of Alban Berg*, op. cit., pages 47-48, and G. Perle, *The Operas of Alban Berg: 'Wozzeck'*, op. cit., pages 133-140), and in the Lyric Suite, as an element of the primary invariant cell A-Bb-B-F, representing the initials of Alban Berg and Hanna Fuchs-Robettin (D. Jarman, *ibid.*, page 82, and G. Perle, *The Operas of Alban Berg: 'Lulu'*, op. cit., pages 13-14).

(discussed in Part C.3 of Chapter 3); the 'white-note' content at the start of Opus 4/1 hints at C major, as do bars 16-22 (see Part B.3 of Chapter 4), and there is a D pedal from bar 24, leading to a dichotomy with G in bars 30-37 (see Part C.1 of Chapter 4); Opus 4/5 has G and C as two of its foci (together with E: see Part B.3 of Chapter 4); and Opus 5 has suggestions of G and D in No. 1, D at the start and end of No. 2, and hints of all three pcs as foci in Nos. 3 and 4 (see Parts C.2 and C.5 of Chapter 5).³

2

Chapters 2-5 have accounted for the presence of a wide range of symmetrical formations in each work, ranging through interval cycles, wedge formations, transpositionally invariant sets and aggregate systems. Although there is a general process of refinement with each progressive work in the degree of sophistication with which Berg uses the various technical procedures described, principal differences tend to be ones of *genre* and compositional expediency. All of these works represent vital first essays in Berg's engagement with significant aspects of his expressionist style: atonal writing in Opus 2/4, large-scale motivically-based developmental writing in Opus 3, orchestral writing in Opus 4, and non-motivic writing in Opus 5.⁴ Pitch organisational techniques and melodic constructions are to a large extent inextricably tied to matters of structure and texture; in this regard, the mix of chordal and linear four-part writing in the Quartet could, for instance, link this work as much to the later Lyric Suite as to its immediate neighbours.⁵ The three central *Altenberglieder* and the whole of Opus 5 represent a more radical departure in their brevity and athematicism (although Opus 5 has clear *genre* similarities to the fourth Opus 2 song, in the individual treatments given to the vocal/solo line on the one hand and to the piano on the other).

³An exploration of D as a key and focal pitch can be found in D. Jarman, *The Music of Alban Berg*, op. cit., page 18, note 1, embracing Opus 6, *Wozzeck* (the D minor interlude) and *Der Wein*.

⁴The Piano Sonata, Opus 1, represents, in the same way, Berg's first major essay in writing for the piano.

⁵One might speculate that Berg's increasingly sophisticated handling of Schoenberg's twelve-note method, starting with the second setting of *Schliesse mir die Augen beide* and proceeding with the Lyric Suite and *Der Wein*, parallels his adoption of atonality in the similarly *genre*-related sequence of fourth Opus 2 song, String Quartet and *Altenberglieder*.

Berg's changing approach to the various innovations found in these works has elicited a parallel response in the analytical methods and theoretical ideas applied to each in Chapters 2-5. Opus 2/4 (and *ipso facto* Chapter 2) has presented a relatively straightforward exegesis of the range of symmetrical constructions (as described by George Perle in his various writings⁶); they are used here in an experimental but relatively ingenuous way to hold together the song's response to the text and its general atonal fabric. Opus 3 (and Chapter 3) has tackled two major issues, the continuous development of ideas from an initial *Grundgestalt* in the first movement (following Schoenberg's lead, and reflected in Janet Schmalfeldt's essay on Berg's Opus 1⁷), and the widespread employment of opposing whole-tone areas, including in the first movement the use of vertical whole-tone vs. linear semitonal (and other 'odd'-interval) constructions, and of 'tonic' and 'dominant' whole-tone areas, and in the second movement the setting up of a D/G focal dichotomy within a sum 8 dyadic framework using whole-tone conflict.

Opus 4's symmetries and wedge formations are ostensibly simpler than in Opus 3, but play a more structurally vital role, and are often concealed within other constructions or are combined with other symmetrical or aggregate arrangements, forming links, simultaneities and transformations, often via shared pc sets. While Chapter 4 has engaged in an examination of the interrelationship between several six, seven and eight-note aggregates from Opus 4, each acting as functionally adaptable and practicable alternatives to the full twelve-note collection, these have subsequently provided an insufficient corollary for assessing and interpreting Opus 5's less overtly clear cellular relationships, aggregate fragments and segments, and its more overtly atonal (and less symmetrical) formations.

Chapter 5 has consequently proved more speculative in its exploration of meaningful relationships, initially in its semiotic inventory of repeating cell-shapes and associated larger sets, and later in its quest for a significantly wider and more systematic presentation of a contextually-derived range of systems. The resulting series of generative chains has

⁶e.g. in G. Perle, 'Berg's Master Array of the Interval Cycles', op. cit.

⁷Berg's Path to Atonality: The Piano Sonata, Op. 1', op. cit.

owed much to the earlier chapters' symmetrically-based systems, but has incorporated other chains of relationship correlating with the governing non-symmetrical sets of Opus 5. This approach can usefully be applied to other works:⁸ a study of Opus 2/4, for instance, reveals a Sequence G correspondence between the piano's opening bar, which features pc sets 8-Z15, 5-20 and 4-Z29, the central point of the song in the piano (at *Zeit lassen*, bars 11-12), which has the related sets 7-20, 4-Z15 and 4-Z29, and the circle-of-fourths series of chords near the end of the song, which again incorporate 7-20, 4-Z15 and 4-Z29 (Example 2.6). Simultaneities and correspondences between generative sequences in Opus 2/4 differ somewhat from those noted in Opus 5, however, notable in an octatonic/hexatonic dichotomy (Sequence J against Sequence A/A(2)), operating principally in bars 12-15 and again in the closing bars.

3

Further comparisons and associations between the works can be advanced through an exploration of two other pitch-organisational perspectives.

The first of these schemata amplifies the zigzag patterns of aggregate presentation set out in Chapter 2's Example 2.3 and the 'alternating interval' cycles of Chapter 4's Example 4.14b to embrace a wider variety of parallel (transpositional) cyclic superimpositions, both scalic and zigzag. A classificational distinction accordingly emerges between on the one hand the generating pc sets from the invariant interval cycles, and the three, four and five-note cell-shape pc sets which are generated by them.⁹ Example 6.2 shows the scalic or zigzag patterns for each aggregate system, and Table 6.1 lists the generators, intervallic shape, cell shape pc sets and cell/motive 'names' associated with each pattern. Each pattern's title reflects the aggregate type which is ultimately generated.¹⁰ Further superimpositions, of diverging/converging (inversional) cycles of the same type, can be

⁸Several works by Webern and Schoenberg from this period would seem to incorporate a similar range of significant pc sets; see also the list of correspondences between Opus 5 and *Wozzeck*, given in footnote 50 of Chapter 5.

⁹And six-note cells in the case of octatonic and diatonic 'proto' sets.

¹⁰*Octatonic*/1, /2 and /3 are notionally 'octatonic'.

classified in a similar way, shown in Example 6.3 and Table 6.2; these diverging cycle patterns combine a series of segments from different zigzag/scalic patterns of the same generative-cycle origin, include all of the three-note intervallic patterns, and reflect a correspondingly wider associative network of trichords, tetrachords and pentads.

Tables 6.1/6.2 and Examples 6.2/6.3 provide a vital connective conduit through which all of the previous forms of pitch organisational categorisation can be compared, embracing interval cycles, transpositionally invariant (TINV) sets, sum-symmetrical matrices and wedge formations (Chapters 2-5), the intercorrelation of motives (Chapters 3 and 4), the superimposition of interval cycles (Chapter 3), the interaction of aggregate systems (Chapter 4), analysis through intervallic cell shapes and generative sequences (Chapter 5), and hexachord families of equivalence/similarity (Chapter 5). Thus, the superimposition of two transpositional levels of the same generating interval cycle,¹¹ or two diverging/converging instances of the same interval cycle, give a different cycle, TINV or aggregate system, in scalic or zigzag form; the generated scalic or zigzag patterns replicate symmetrical alternating and simultaneous cycles commonly found in Opus 3/2; segments of the generated patterns replicate many of the wedge formations, or many of the intervallic shape-cells and motivic segments found in all four works, some of which represent pc sets which act as intersection sets between more than one system; the generation of scalic and zigzag patterns from an interval cycle resembles in some instances the generation of sequences from two and six-note progenitors in Chapter 5; and the single-note modification techniques required for the alteration of sum symmetrical matrices into asymmetrical atonal ones (explained in Section 4 below, and in Example 6.4) largely parallels (and helps to explain) the single-digit equivalence modifications within sequence-based hexachord families outlined at the end of Chapter 5.

The most common diverging-cycle pattern (Example 6.3 and Table 6.2) is that of interval-1, standing for all of the semitonally-orientated incrementally-widening wedge formations, such as Opus 4's δ . This, and the other pattern involving the full chromatic, that based on

¹¹Sometimes three.

diverging interval-5 cycles, can give the PI dyad arrangement Bb-B, F-E, Db-Ab, G-D found in Opus 4/4's bars 1-7, Example 4.16f (which emerges in fully-realised 5-cycle form in the Lyric Suite's first movement 'all interval' series; see footnote 34 of Chapter 4).

The principal parallel-cycle (zigzag/scalic) patterns (Example 6.2 and Table 6.1) across the four works include *Octatonic/1*, *Octatonic/4*, *Hexatonic/3*, *Diatonic/5*, and a group of associated patterns comprising *6-7/1*, *12-note/1* and *Semitone/4* (all diverging interval-1 cycle elements). Specifically: the (1-3-1-3...) overlapping of the hexatonic pc sets 4-7 and 4-17 of Opus 2/4, 3/1 and 4/2 (Example 6.1a) and the $a3/(1-3)/ritornello/IIIb$ cell shape of Opus 3/1, 3/2, 4/1 and 5/1 (Example 6.1d) occur in *Hexatonic/3*; the $b4/(1^2)/Ia/\delta/\zeta$ cell shape of Opus 3/1, 4/1, 4/5, 5/1 and 5/4 (Example 6.1c) occurs in *Semitone/4*; the $b3/(5-1)/\alpha/\epsilon$ cell shape of Opus 2/4, 3 and 4 (Example 6.1e) occurs in the 4-9-based ('Lulu' cell) *Octatonic/1*; the $a1/((5-5)/IXb/\alpha$ cell shape of Opus 3 and 4 (Example 6.1f) occurs in the fourths-cycle *Diatonic/5*; and the pc set 4-17/ $(4^1 1^4)/IIIc/\delta/\epsilon$ cell shape of Opus 2/4, 4 and 5 (Example 6.1g) occurs in *Octatonic/4*.

The alternating-interval cycles prevalent in Opus 3/2 conform to several of the patterns: the (7-6)/IVd *6-7/1* pattern (in bars 5-10, Example 3.22a); the (6-1)/IVc *6-7/2* and/or the (7^1) *Octatonic/1* pattern (in bars 24-28, Example 3.23d); the (6-1)/IVc *6-7/2* pattern (in bars 72-87, Example 3.22b); the (4-3)/Va'4-20' *Diatonic/4* pattern (in bar 78, Example 3.22c); the (5^6) *6-7/1* pattern (in bars 114-117, Example 3.23g); the (1-1-5) *12-note/2* pattern (in bars 148-151, Example 3.22d); and the (7-4) *12-note/1* pattern (in bars 230-232, Example 3.23l).

The *12-note/1* pattern is also represented in Opus 2/4 by four (4-7) chords (bars 13-14, shown as 3-4s in Example 6.1b), in Opus 3/1 by the (4^5) of the tail of *a1*'s wedge, in Opus 3/2 by the *grazioso* theme's (4-7-4) descent and the diatonic theme's ascending (4-7) tail (3-4s in Example 6.1b), and in Opus 4 by motive α 's central $(5^4 5)$ shape and motive δ 's (4^5) wedge segment (c.f. the same three pitches, Bb-D-A in *a1* above).

Octatonic/1 (the 'Lulu' cell) also appears in $(7^1 1^7)$ form in Opus 2/4 (bar 11's fifths rising/falling in tritones), in $(5-1-5)$ form in Opus 4/2 (bars 2 and 10) and in the α motive (notes 2, 3, 5 and 6), and in $(5^1 1^1 5)$ form in Opus 4/4's Db-Ab (voice, bar 4) imitated by G-D (cor anglais, bars 6-7)- Example 4.10; *Octatonic/1* elements do not, however, figure as Opus 5 cell shapes.

Hexatonic/3 is further represented in Opus 4/3 by the clarinet's $(9^1 1^9)$ extension of the twelve-note chord in bars 8-9 (Example 4.16e), in the sequentially repeated (1-3) Eb-D-B in bars 25-27 of Opus 4/4 (Example 4.11), and in the (1-3) interaction of semitonal dyads in bars 23-29 of Opus 4/5 (Example 4.18).

$6-7/1$ is most typically portrayed in the semitonally-descending $(5-6)$ pc set 3-5 chords of Opus 2/4, bars 20-22 (Examples 2.6, 2.7 and 6.1b), and of Opus 3/1, bar 101 (Example 3.21), and in the $(5-6)$ component of the quartal IVa/4-16b $(6-5-5)$ cell shape which features in the first three Opus 5 pieces (Example 5.7b), and which has been presaged twice in Opus 4/4, in bars 20-21 (Example 4.17b); the $6-7/1$ pattern appears in other forms through a $(6^5 6-7)$ shape in Opus 3/2's *marcato* theme (its Ab-D-G-C#-F#), through (11^6) and $(7-6)$ shapes in Opus 4/1's I/VI and V/IX motives, and through an overlapping $(7-6)$ and $(6-5)$ in the lowest pc set 4-9 segment of the Opus 4/3's twelve-note chord (Example 4.34a, more correctly categorised as a rearranged *Octatonic/1*).

Diatonic/4 appears in Opus 3/2 as a stacked chord (bar 78, Example 3.22c, also shown as 3-4s in Example 6.1b) and in Opus 5 as cells Va (3-4) and '4-20' (4-3-4), the latter being prevalent at the start and end of the fourth piece (as components of the initial piano chord, and as the final major-seventh chord in the piano).

The inter-work coincidence of certain patterns is of interest. *Octatonic/4* $(4^1 1^4)$ and *Diatonic/3* $(4-1-4)$, both pc set 4-17-based, are present in Opus 2/4, Opus 4 and Opus 5, but are absent from Opus 3, while the other 4-17-based pattern, *Hexatonic/3* $(3-1-3)$, is prominent in all movements excepting Opus 5/2, 5/3 and 5/4. *Octatonic/3* $(2-4-2)/(2^8)$ is

common in Opus 2/4, Opus 3 and Opus 5, but appears in only the third of the Opus 4 songs. *Octatonic*/7 (7-8)/(5-4) forges a link between Opus 2/4 and Opus 5, while *Octatonic*/8 (3-6-3-6) links Opus 3/1 with Opus 5/2, *Whole-tone*/3 (2^4^2) links Opus 3 with Opus 5/3, and *Semitone*/1 (1^3) and *Semitone*/5 (3^4) also link Opus 3 with Opus 5. *Semitone*/3 (2^3) proves to be an 'early' phenomenon, in just Opus 2/4 and Opus 3/1, and a few patterns (*Octatonic*/5, *Hexatonic*/2, *Diatonic*/1 and *Diatonic*/6) figure hardly at all. The most widely-used patterns are the diverging interval-1 cycle-associated 6-7/1 (6-5-6), present in all except Opus 4/5, and 12-note/1 (5^4^5), found in all except Opus 4/3 and 4/4.

Most of the collections of generated sets (see Table 6.1) closely resemble associated elements from the generative sequences provided for the Opus 5 pc set analysis of Chapter 5, Part C.5, namely: *Octatonic*/1, /2, and /3 (in the three strands of Sequences D and Ja)); *Octatonic*/4, /5, /6 and /7 (in strand c) of Sequence J); *Octatonic*/8 (in Sequences D and Jd)); *Hexatonic*/1, /2 and /3 (in the three strands of Sequence A(2)); *Whole-tone*/2 and /4 (in Sequence E), 6-7/1 and /2 (in the upper strand of Sequence C); *Diatonic*/1, /2, /3, /4, /5 and /6 (in strands a), b) and c) of Sequence K); 6-30/1 (in Sequence Jd)); and 12-note/2 (in the upper strand of Sequence C). This reciprocity enables the transference of any elements of cell-shape analysis into elements of sequence analysis, and *vice versa*.

Patterned sets can refine Chapter 4's investigation of intersection sets between aggregate systems (Venn Diagrams 4.1 and 4.2): pc set 4-17 (*Octatonic* and *Hexatonic*) corresponds with the congruence between *Octatonic*/4 and /7 and *Hexatonic*/2 and /3; pc sets 3-8 and 4-25 (*Octatonic* and *Whole-tone*) correspond with the congruence of *Octatonic*/3 and *Whole-tone*/2 and /4; pc sets 3-5 and 4-9 (*Octatonic* and 6-7) correspond with the congruence of *Octatonic*/1 and 6-7/1 and /2; pc sets 3-7, 3-11, 4-10 and 4-26 (*Octatonic* and *Diatonic*) correspond with congruencies between *Octatonic*/5, /6 and /7 and *Diatonic*/1, /2 and /4; pc set 3-12 (*Hexatonic* and *Whole-tone*) is the generator of *Hexatonic*/1, /2 and /3, *Whole-tone*/1 and /2 and *Augmented*/1; and pc sets 3-4 and 4-20 (*Hexatonic* and *Diatonic*) correspond to *Hexatonic*/1 and /2 and *Diatonic*/3 and /4.

The second pitch-organisational device meriting exploration entails a single-note modification of symmetrical six-note TINVs in order to create hybrid asymmetrical hexachords. This contrivance comprises an exchange technique, where complementary transpositionally-parallel scalic sets or sum-symmetrically-inversional matrices can be minimally altered through the transposition of one equivalent element from and between each in order to create different (but related) hexachords. Example 6.4 shows a sample involving the transformation of the hexatonic TINV, pc set 6-20, into related hexachords 6-Z19/Z44, 6-14, 6-15, 6-16 and 6-31; in the case of 6-Z19/Z44 and the complementary 6-14s, parallel scales are involved, at T-2/10 and T-6 respectively, while for the remaining three sets and their complements, one single odd-interval inversional matrix of mirrored 6-20s suffices to illustrate their formation, where either of the ic1 pairs can exchange to produce mirrored 6-31s, either of the ic3 pairs can give 6-16s, and either of the ic5s can provide the remaining complementary 6-15s. All of these interval-pair exchanges replicate the plus/minus adjustments required for the same hexachords in the '6-20 family' column of Chapter 5's Table 5.6.

A consideration of the 6-Z19/Z44 modification to 6-20, together with a similar 8-Z15/Z29 modification to another TINV, pc set 8-9 (Example 6.5a), allows Opus 5's *initial phrase* 6-Z44/8-Z29 to be assessed in relation to an almost-present 6-20/8-9 basis, in order to pinpoint its various potential axes of symmetry. Example 6.5b shows each theoretical axis (i.e. at sums 3, 7 and 11) and suggests that sums 3 and 11 are the more compositionally valid (confirming sum 3, given earlier in Example 5.9a, but giving an alternative to the original sum 6).

Similar exchange techniques to those applied to 6-20 can be used to create all the other hexachords, as grouped in the remaining hexachord families shown in Table 5.6, although some will require a shift of axis or the placement of the retrograde of one scale against the

prime of its complement in order to bring the requisite exchange elements together. Thus: the transformations required to fashion members the '6-7 family' would involve parallel scales at T-3/9 or a single odd-interval inversional matrix; those for the '6-30 family' would use two odd-interval inversional matrices, retrogrades or shifted retrogrades; those for the '6-35 family' would be based on parallel scales at T-1/11, T-3/9 or T-5/7, or a single odd-interval inversional matrix; those for the '6-32 family' would use parallel scales at T-6, one odd and one even-interval inversional matrix, or shifted parallel scales; and those for the '6-1 family' would incorporate parallel scales at T-6, or odd or even-interval inversional (shifted) matrices. In all cases, complementary pairs of a hexachord or complementary Z-related hexachords can be formed from complementary pairs of a 'mother' hexachord through the exchange of one element, as has been shown in Example 6.4, and so that, as before, the interval between exchange elements corresponds to the plus/minus numeral as shown in Table 5.6.

A series of basic relationships between system aggregates can ultimately be proposed, using similar methods of exchange, revealing that the hexachordal TINVs themselves are related to a basic semitonal or interval-5 odd-interval inversional matrix: Example 6.6 shows that an exchange/reversal to the fourth, fifth and sixth pairs (or PI-dyads) results in complementary 6-7s; an exchange to the third and fourth PI-dyads (both ic5) produces hexatonic 6-20s; an exchange to the third, fifth and sixth PI-dyads (one each of ics 1, 3 and 5) gives 6-30s; and an exchange to the second, fourth and sixth PI-dyads (again, one each of ics 1, 3 and 5) gives complementary whole-tone (6-35) scales.¹²

¹²Odd-summed inversionally-related complementary forms of a twelve-note series, directly deriveable from the inversionally-arranged chromatic scales of Example 6.6 in a way analogous to the exchange procedure outlined above, are a feature of the treatment of Dr. Schön's series in the five-strophe aria in Act 2, Scene 1 of *Lulu*, described in D. Jarman, 'Dr. Schön's Five-Strophe Aria', op. cit., and, subsequently, in G. Perle, *The Operas of Alban Berg: 'Lulu'*, op. cit., pages 167-178.

It is a generally held view that throughout his composing career Berg held an enduring interest in the range of technical procedures already found in his earlier works.¹³ The Three Orchestral Pieces, Opus 6, of 1914-15 confirm Berg's abiding fascination for a continuous development of material from intervallic cells, but on a much larger scale than in Opus 5; there is, however, a compensating return to thematism. There is some disagreement over the use of wedge formations in Opus 6- DeVoto says almost none, while Taylor finds several in the '*Präludium*'¹⁴- but otherwise many technical features from the earlier works are woven as before into the developmental and transformational fabric, including the repetition or near-repetition of cell shapes, using I, R, and RI forms, and the use of semitonal lines as linking devices.

The opera *Wozzeck* (1917-22) contains themes, *Leitmotives* and cells which incorporate more fully the technical features found in the earlier works, using a wide range of symmetrical devices, invariant pitch groupings and intervallic shape patterns, but within a more controlled structural framework.¹⁵ Many of the techniques have their origin in Opus 2-5, particularly from the *Altenberglieder*. Perle cites: wedge formations (pp. 127 and 159); the use of *ostinati* (pages 169-170), including progressive phrase expansion, a device previously used, for instance, in Opus 2/4, bars 12-15, in the piano, and in Opus 4//4, bars 10-15, in the voice, xylophone and violin; a twelve-note *Passacaglia* theme, emulating the one in Opus 4/5; whole-tone alternation (pages 155-156); a twelve-note aggregate from three diminished sevenths (page 161), already presaged by the similarly-constructed octatonic-plus-diminished seventh aggregate in Opus 4/3- see Chapter 4, Part B.3, and Example 4.16e; an aggregate series (pages 166-167), whose varied treatment is

¹³e.g. D. Jarman, *The Music of Alban Berg*, op. cit., page 79, and D. Gable and R. Morgan in their Introduction to D. Gable and R. Morgan, eds., *Alban Berg: Historical and Analytical Perspectives*, op. cit., pages 5 and 7.

¹⁴M. DeVoto, 'Alban Berg and Creeping Chromaticism', op. cit., page 75; Michael Taylor, 'Musical Progression in the "Präludium" of the Three Orchestral Pieces Op. 6', in *The Berg Companion*, ed. by D. Jarman, op. cit., pp. 123-140 (pages 132, 135 and 136).

¹⁵See D. Jarman, *The Music of Alban Berg*, op. cit., pages 47-72, and G. Perle, *The Operas of Alban Berg: 'Wozzeck'*, op. cit., page 125 and pages 145-171.

reminiscent of that accorded motive IV in bars 25-29 of Opus 4/1; cycles of fifths/fourths, including 'open string' fifths (pages 162-163); the quasi-canonic modification/shortening of a phrase through semitonal inflection, at the start of Act 3 (page 160), a procedure which has occurred previously in Opus 4/5, bars 50-54, in the brass; differing juxtapositions of prevailing melodic features (pages 166-167), which is a feature of the treatment of the *passacaglia* themes in Opus 4/5; and the verticalisation of a theme (page 165), previously found in the treatment of the *marcato* theme in bars 28-33 of Opus 3/2, and in the chordal versions of motive β in Opus 4/5, at bars 36 and 54-55.¹⁶

Common characteristic intervallic patterns or cells in *Wozzeck* are the major third-plus-perfect fifth within major seventh, (4-7), found in the '*Wir arme Leut!*' motive¹⁷ and as a chord or chord component in either inversion,¹⁸ and related assemblages based on major and minor thirds, (3-4),¹⁹ and minor third(s)-plus semitone, (1-3),²⁰ in either arpeggiated or chordal form. The perfect fifth as the lowest component of chords, a common element in the earlier works, remains a feature of *Wozzeck*; inevitably, the traditional and 'natural' aural characteristics of this interval as a harmonic underpinning agent causes the lower component to function, however temporarily, as a focus (the primary perfect fifth of this type, G-D, occurs in the principal referential chord of the opera (Cadential chord B): see footnote 50 of Chapter 5).

In the Chamber Concerto of 1923-25, a principal technical feature is the presentation of material in P, I, R, and RI forms.²¹ Differing aggregate and interval cycle elements are superimposed in a manner similar to that in Opus 3 and Opus 4, as for instance in the simultaneous presentation in bars 16-20 of the first movement of a cycle-of-fourths 12-note aggregate against rising sequences of minor thirds and semitones, first as a hexatonic

¹⁶Ibid.

¹⁷Ibid., examples on pages 97-98.

¹⁸Ibid., examples on pages 66, 119, 138 and 143 (chords Y and Z of the 'basic chord-series'), 121, and 142 (the chord of Act 3, scene 4).

¹⁹Ibid., examples on pages 98, 111, 112-113, 121, 146 (cell C) and 151 (pentad X).

²⁰Ibid., examples on pages 101-103 (Marie as mother), 104, 112, 145-146 (cell B), 147 (the 'basic pentad'), and 162.

²¹D. Jarman, *ibid.*, page 73.

(3-1-3-1-3) pattern, then as incomplete diminished-seventh segments forming a (3-3-1-3-3-1-3-3) pattern, and finally as a complete diminished-seventh-based 12-note aggregate (3-3-3-1-3-3-3-1-3-3-3).²² Other cyclic or symmetrical material can seem less as clearly-integrated elements within the motivic and harmonic structure, but rather as syntactical conceits: note, for instance, the somewhat over-stated appearance of the chord progression in the first movement, bars 98-102,²³ compared with the integrated nature of the same progression in the second movement of the Opus 3 Quartet, bars 13-15 (Example 3.23b).²⁴

The Lyric Suite of 1925-26 adopts technical devices from its Opus 3 predecessor, for instance in the first movement, bars 15-16, where the series is sounded in T-0, T-3, T-6 and T-9 forms as parallel diminished sevenths (6-9-6), resembling the passage in Opus 3/1, bars 98-101, where the lower three instruments play in parallel diminished triads (3-6), major triads (5-4), perfect fourths (5-5), augmented triads (4-4) and pc set 3-5s (6-5). The Lyric Suite's structural use of retrograde in movement 3 (a device also found in the film interlude to Act 2 of *Lulu*) recalls the retrogressive structure of Opus 4/3.

By the time of his second opera, *Lulu* (1929-35), Berg was successfully incorporating symmetrical and cell structures *into* the basic serial material from which the music (and characters) were to be shaped and integrated. Perle and Jarman have shown that the different series employed are interrelated not just through their numerical and pitch class-associated forms of construction,²⁵ but also through common intervallic groupings, called 'common horizontal figures' by Jarman.²⁶

²²Ibid., example given on page 77.

²³Ibid., example given on page 23.

²⁴The same progression is, however, seamlessly integrated into the motivic fabric at the transition between Variations I and II of the *Lauterlied* Interlude between Scenes 1 and 2 of Act 3 of *Lulu*, bars 683-687 (quoted in G. Perle, *The Operas of Alban Berg: 'Lulu'*, op. cit., page 141, as being bars 705-709).

²⁵As in the separation of quasi-tonal 'white' and 'black' segments of the 12-note aggregate, for instance, in the Basic series (two all-combinatorial 6-32s), the I-0 inversion of Dr. Schön's series, Alwa's series, the Countess's tropes, the Athlete's chordal tropes, the Picture chords, and Basic cell II: shown in G. Perle, *Serial Composition and Atonality*, op. cit., pages 142-145, D. Jarman, *ibid.*, pages 88-90 and 93, and G. Perle, *The Operas of Alban Berg: 'Lulu'*, op. cit., pages 96-97, 99, 101, and 110.

²⁶Ibid., pages 91-92, developed from George Perle, ' "Lulu": Thematic Material and Pitch Organisation', *Music Review*, Vol. 26 (1965), 269-302 (page 301).

Common intervallic shapes include

- (4-1) in the Basic series and Dr. Schön's series (with the related (8¹) in the Athlete's series)
- (1³) in the Basic series, Dr. Schön's series and Lulu's series
- (3⁵) in the Basic series and Alwa's series
- (5-2) in the Basic series, Dr. Schön's series, the Countess's Trope B and Basic cell II, and the related (2⁷) in Alwa's series, the Athlete's series and Lulu's series
- (2-3) in the Basic series, the Countess's Trope C, the Athlete's 'black-key' trope and the Athlete's series
- (1-7) in the Basic series, the Schoolboy's serial trope and the Marquis's series, and the related (1⁵) in Dr. Schön's series and the Athlete's series
- (7-2) in the Basic series, Alwa's series and the third and fourth Picture chords
- (5-4) in Dr. Schön's series and the related (5⁸) in the Athlete's series
- (1⁶) in Dr. Schön's series, Alwa's series and the Marquis's series
- (6³) in Dr. Schön's series and Alwa's series
- (2-1) in Dr. Schön's series, the Athlete's 'white-key' trope, Schigolch's serial trope, Lulu's series and Basic cell II
- (6-5) in Dr. Schön's series and the Marquis's series (with the related (6⁷) in Alwa's series)
- (3-1) in Alwa's series, the Schoolboy's serial trope, and the second Painter's chord
- (1-5) in the Countess's Trope B and Basic cells I and II (with the related (1⁷) in the Athlete's series and Lulu's series)
- (2-2) in the Countess's Trope C, the Athlete's tropes, the Schoolboy's serial trope and Lulu's series
- (2¹) in the Athlete's series, Schigolch's serial trope and the Marquis's series
- (2⁷1) in the Athlete's series and Lulu's series
- (1-1) in Schigolch's serial trope and the Marquis's series
- (2-4)-4) in the Schoolboy's serial trope, the Painter's first and third chords and Lulu's series
- (5⁴) in the Marquis's series and the related (8-5) in the first Picture chord

- (3-3) in the Painter's second chord and Basic cells III and V

Berg's flexible approach with his series also allows him to build symmetrical structures such as the $(1^6 1^6 1)$ pattern quoted from Act 3 by Perle and derived from Basic cell I,²⁷ and the $(5^8 5^8 \text{ etc.})$ and $(5^2 5^2 \text{ etc.})$ quoted from Act 1 by Perle and derived from diminished-seventh elements from Trope II dovetailed in parallel.²⁸

Three intervallic cell shapes in particular recur as important elements throughout Berg's *oeuvre*. Cell (1^2) , designated pattern *Semitone/4* in Table 6.1, and noted as being cell Ia in Opus 5, the opening part of motive *b4* in the first movement of Opus 3 (Example 3.1) and part of motives δ and ζ in Opus 4 (Examples 4.4 and 6.1c), can also be found in Opus 6 in many of its tortuously developed melodic lines, e.g. the B-Bb-C from a main theme in the *Marsch*,²⁹ and the Bb-C-B and the B-A-Bb-Ab with G-F-Gb-Fb in parallel major-thirds from related phrases,³⁰ also in *Wozzeck*, Act 2, Scene 2, in the Captain's *Leitmotive*,³¹ in the Lyric Suite, movements 2 and 4,³² and in three of *Lulu*'s series (see footnote 357).

Cell $(5-6)/(5^6)/(6-7)/(6^7)$, designated pattern 6-7/1 in Table 6.1, often appears as a chord component in the earlier works, and subsequently within complex chords in Opus 6 (such as Taylor's quartal *e*, *g* and *h*,³³ and Jarman's cell *y*³⁴) and in *Wozzeck* (e.g. the lower (7-7-6) component of Cadential chord A,³⁵ the lower (6-7) component of the first chord of the opera, and the upper (6-7) component of the 'knife' motive). In Opus 1 it forms the opening idea, a rising G-C-F#, in Opus 5 it forms cells IVa and IVd, it is an important component of the *marcato* theme in the second movement of Opus 3, and of motives I/VI and V/IX in the first song of Opus 4; it subsequently contributes to many of the widely spaced melodic

²⁷*The Operas of Alban Berg: Volume Two 'Lulu'*, op. cit., page 88, third stave of his Example 29.

²⁸*Ibid.*, page 90, his Example 34.

²⁹Example given in D. Jarman, *ibid.*, page 41 (his Example 39).

³⁰*Ibid.*, page 43 (his Example 43a) and b)).

³¹G. Perle: *The Operas of Alban Berg: 'Wozzeck'*, op. cit., page 65 (Perle's Example 19).

³²Examples in T. W. Adorno, op. cit., pages 109 and 111 (the latter in a (1-10) orientation).

³³M. Taylor, op. cit., pages 131 and 132.

³⁴*Ibid.*, pages 40 and 42.

³⁵*Ibid.*, page 47.

lines in Opus 6³⁶ and in three of the *Lulu* series (see above) and in some orientations of the *Lulu* Basic Cell 1,³⁷ and it forms the pivotal point of three of the series used in the Lyric Suite (as (5⁶7) or (5⁶)).

The third cell, (1-6)/(1⁶), also involves the tritone; it is designated pattern 6-7/2 in Table 6.1. This cell appears in Opus 1 (e.g. in the *Langsamer* section starting at bar 30), in the second movement of Opus 3 (as a (6-1-6-1, etc.) pattern in cello and viola, bars 25-28, and in bars 72-85), in the first song of Opus 4 (motive IV's (1⁶11⁶-1)) and in Opus 5 (cells IVb and IVc); it is subsequently a common melodic segment in *Wozzeck*,³⁸ the Lyric Suite (in series B and C,³⁹ used in movements 3 and 6) and *Lulu* (in three of the series, see footnotes 357, and in some orientations of Basic Cell 1⁴⁰).

6

The generative sequences of Chapter 5, Part C.5, as shown in Table 5.3, do not together form a fully-fledged pitch-class set genera system, partly because no chromatically-based sequence has been incorporated, but also because only 132 of the 232 pitch class sets have been included.⁴¹ Two fully-realised genera systems have to date been published, those of Forte (comprising twelve genera and four supragenera) and Parks (five genera).⁴²

³⁶Ibid., pages 42-43, Jarman's Examples 42 and 43c) and d); also, B. Archibald, op. cit., page 118, sixth stave of his Example 26.

³⁷e.g. the (5⁶-5) of Dr. Schön's '*Nein, nein! Nein! Nein!*', quoted in G. Perle, *The Operas of Alban Berg: 'Lulu'*, op. cit., page 88, Example 29.

³⁸e.g. in the Captain's and Doctor's *Leitmotives*, in the *Passacaglia* theme (twice), M. Carner, op. cit., pages 163, and in the Act 2, Scene 4 *Ländler*, G. Perle, *The Operas of Alban Berg: 'Wozzeck'*, op. cit., page 116.

³⁹D. Jarman, *The Music of Alban Berg*, op. cit., page 126.

⁴⁰e.g. the (6¹6) quoted in G. Perle: *The Operas of Alban Berg: Lulu*, op. cit., page 88, Example 29, third stave

⁴¹i.e. Forte's 220 pc sets, plus the six intervals of cardinal 2 and the six complementary sets of cardinal 10: *The Structure of Atonal Music*, op. cit.

⁴²A. Forte, 'Pitch-Class Set Genera and the Origin of Modern Harmonic Species', op. cit., pages 201 and 264-266; R. S. Parks, op. cit., pages 324-332.

The present generative sequences, as they stand, resemble Parks' genera rather more closely than those of Forte, since

- Parks' first four genera are relatively small, similar in total size to Sequences A through to K; he is only able to complete his collection through an extremely large 8-17/18/19-complex genus
- three of Parks' first four genera, his 'diatonic', 'whole-tone' and 'octatonic', closely resemble the content of the corresponding Sequences K, E and J, while the 'characteristic' sets of his 8-17/18/19-complex genus comply closely with Sequences A, A(2) and B
- both Parks' genera and the present generative sequences have been tailored to correspond to characteristic pitch formations found in particular repertoires and to the actual pitch structures found in individual pieces, i.e. in the music of Debussy for Parks and in Berg's Opus 5 and Opus 2/4 in the case of the present study

The principal difference between Forte and Parks (and, by implication, between Forte and the present generative sequences) has been aired during recent exchanges between the two, both at the Cambridge University Music Analysis Conference Symposium on pitch class set genera (August 1997) and in the ensuing *Music Analysis* issue devoted to the event,⁴³ with Parks stating that 'it is likely that each repertoire will require its own genus-models for achieving a "good fit" '⁴⁴ and Forte emphasising that 'no such constraint exists in the case of my pitch-class set genera, which are abstract and unattached to any particular harmonic vocabulary.'⁴⁵ Despite this fundamental point of contrast, some sets selected by Forte on the basis of their prominence in early twentieth century *avant-garde* music correspond with important sets from the generative sequences found to govern Opus 5 in Part C.5 of Chapter 5, i.e.:

- 6-Z19 and 6-Z44, the foci of Sequences B, G and I
- 4-19 and 5-21, principal links in Sequences A, B and I
- 4-Z15 and 4-Z29, prominent in Sequences F, G and J

⁴³*Music Analysis*, Vol. 17, No. 2 (1998), 123-244

⁴⁴Richard S. Parks, 'Pitch -Class Set Genera: My Theory, Forte's Theory', *Music Analysis*, Vol. 17, No. 2 (1998), 206-226 (page 212).

⁴⁵Allen Forte, 'Afterward', *Music Analysis*, Vol. 17, No. 2 (1998), 241-244 (page 243).

- 4-12, 4-13, 4-18 and 4-27, all non-symmetrical octatonic Sequence J tetrachords
- 6-21, 6-22 and 6-34, the whole-tone-plus-one hexachords of Sequences F and H
- 6-31, one of the hexachords related to 6-20 in Sequence B
- 4-8, 4-10, 4-11, 4-13, 4-14 and 4-16, all Sequence K tetrachords⁴⁶

These prominent sets nevertheless illustrate the nub of the difference between the generic systems, for Forte specifically celebrates the widespread location of these sets, and of otherwise familially-linked sets in general, across his genera. He stresses that the twelve genera display a metaphorical 'spectrum', from diatonic (genera 11 and 12) to 'exotic' (genera 1, 2 and 3), through which scale-based subsets and other generally-associated categories such as aggregate or set complex groupings are 'prismatically filtered'.⁴⁷ One curious point of contact exists, though, between Parks' largest genus, based on 8-17, 8-18 and 8-19, and Forte's genus 9, since the latter's trichords, 3-3 and 3-11, initially generate the complements of Parks' three eight-note sets, i.e. 4-17, 4-18 and 4-19: while each genus' sets of cardinal 4 and 5 cannot be correlated (because Parks' genus includes *all* of the sets from these cardinalities), Parks' sets of cardinal 7 and 8 do complement *exactly* those of Forte's sets of cardinal 4 and 5.

Forte's decision to proceed from trichordal progenitors, and further to allow trichords with common interval-class content to act as dual-progenitors,⁴⁸ leads ultimately to the twelve genera of his system. It is feasible, though, to consider all of the possible trichord pairings as potential elements of generation, as a basis for the creation of sequences of paired or grouped tetrachords and pentads (in the manner of the trichord-to-tetrachord relationships in Forte's genera 5-12), so that patterns of all-inclusivity between sets from adjacent cardinalities are continued to their natural conclusions. Such a method of chaining could then be allied to the existing twelve generative sequences of Table 5.3, and to the single-note modification technique applied within the six hexachord 'families' shown in Table 5.6, in order to create a properly complete and consistent system of classification which

⁴⁶A. Forte, 'Pitch-Class Set Genera and the Origin of Modern Harmonic Species, op. cit., pages 200, 204, and 206.

⁴⁷Ibid., pages 204, 211, 218 and 230.

⁴⁸Ibid., page 189.

might in turn form the basis for a new and differently-derived full pc set genera system. Given an empirical desire to categorise these chains according to both the aggregate systems of Table 5.2 and to the hexachord families of Table 5.6, primary criteria for the allocation of any chain to a generic 'type' would be the need for initial set(s) of lowest cardinality to be subsets of the aggregate defining set and for the governing hexachord(s) to be members of the defining 'family' group.⁴⁹ Under these procedures, chain members can be categorised and listed under the six titles shown in Table 6.3, and the constituent sets can be classified within the six genera shown in Table 6.4. There is an additional need, however, for certain basic forms of chaining with one-to-one pathways, such as those in Sequences A, D and E of Table 5.3, to be incorporated into the appropriate categories, since they are initiatory and fundamental to the whole process of generation, and act as host to certain singular pc sets of high invariance such as 6-20 (hexatonic), 4-28 (octatonic), 2-6 and 6-35 (whole-tone) and 5-Z12 (diatonic) which would not otherwise figure in the corresponding chain-induced genera; these sets are labelled (X) in Table 6.4.

The principal forms of chain categorisation in Table 6.3 are of two types. Firstly, an indication is given as to a chain's relationship to a sequence type, e.g. G(2); this label acts as a general identifier, showing that the set content of at least one cardinality has a resemblance to the original sequence. Secondly, an indication is given as to the type of complementation relation present within a chain: those chains labelled (S) have 'symmetrical' complementation, where larger sets are true complements of smaller sets; those labelled (R) have a 'reciprocal' complementation, where supersets of one Z-designated hexachord are the complements of the subsets of the hexachord's Z-partner, and *vice versa*- these reciprocal chains are bracketed together when they extend beyond their hexachords (as in the Hexatonic) but are otherwise merely labelled (R); some Octatonic chains are labelled (S8) or (R8), indicating that in these instances a symmetrical or reciprocal complementation occurs within an eight-note (8-28) aggregate, in the manner already explored in Sequence J of Table 5.3.

⁴⁹This emphasis on hexachords as progenitors runs counter to Jonathan Dunsby's interpretation that hexachords have no dominant part to play in analysis based on Forte's system of genera: 'Fortenotes', *Music Analysis*, Vol. 17, No. 2 (1998), 177-181 (page 179).

A fundamental function within many of the chains is a transference, through the shift of a single element, from a basic sequence member (as displayed in Table 5.3) to a related adjacent set or sets of the same cardinality, emulating the single-note shift from a 'mother' set in the hexachord 'families' of Table 5.6; this operation is duly furnished through the all-inclusive nature of the set-to-set crossing pathway patterns in the chains shown in Table 6.3.⁵⁰ While it can be seen that specific pc sets often occupy more than one genera (as, too, do sets from the original Sequences F, G and H), the general trend is for chains types to conform to the expected genera: those designated C/C(2) are generically identified almost exclusively with the 6-7 genus, those labelled A/A(2)/B, G/G(2) and I/I(2) are principally a hexatonic phenomenon, the E/E(2), F/F(2) and H/H(2) chains relate to the whole-tone, and the D/J/J(2) and K/K(2) remain respectively octatonic and diatonic. Thus, the genera to some extent prismatically filter the tangible scalic or aggregate-related collections (as in Forte's genera) while retaining a pragmatic basis in their relational links with incipient 'mother' hexachords (as in Parks' first four genera).

The octatonic, whole-tone, diatonic and chromatic genera of Table 6.4 represent expanded forms of Parks' like-named genera, while the 6-7, octatonic, chromatic, hexatonic and diatonic genera bear some relation to Forte's genera 1/2, 3, 5/6, 8/9/10 and 11/12 respectively; Forte's genus 4 contains elements from the hexatonic and whole-tone genera. Whereas Forte's trichord-generated genera each have low representations of trichords and tetrachords (with low duplications between genera) and higher incidences of hexachords (with higher duplications between genera), the burden of regulation in the chain-induced genera has shifted to the hexachords, which are now the least duplicated and least represented within each genus, while sets of lower cardinality are correspondingly higher in their duplication and greater in their incidence within each genus. Some sets (besides the naturally-profligate ones of cardinal 2 and 3) are particularly gregarious, with 4-2, 4-4, 4-12, 4-16, 4-18, 4-22, 5-6, 5-9, 5-24, 5-30, 5-Z36 and 5-Z38 all occupying four genera

⁵⁰Indeed, some of these crossover patterns are already present in the sequences of Table 5.3, in Sequences C, F, G, I and K.

each, while others (besides those hexachords already designated thus in Table 5.6) are exclusively situated, i.e. 5-1 in the chromatic genus, 5-Z17, 5-21, 5-22 and 5-Z37 in the hexatonic, 4-28 and 5-31 in the octatonic, 5-33 in the whole-tone, and 5-Z12 and 5-35 in the diatonic. Some sets group together as linked partners within single sequence-related chains: the connected pentads from Sequences F and H, 5-13, 5-30 and 5-26, are a case in point, appearing together in networks associated with both the hexatonic and the whole-tone genera, while the Sequence G-related sets 5-6, 5-16, 5-20, 5-32, 5-Z18 and 5-Z38 are associated together in reciprocally-related hexatonic chains, and the Sequence I-related sets 5-22, 5-Z17 and 5-Z37 are associated together in hexatonic genera-related chains.

Criteria and rules have now been defined to govern the formation of the genera, to include unifying aspects such as inclusion relations and the generation of a genus from one or more initial sets. Forte and Parks have also defined their interpretative rules by which one genus is given preference over other genera in any particular piece or passage.⁵¹ Such interpretative rules could also be applied when using this new chain-induced genera system, but are not obligatory, since chain types and/or genera relationships can be translated into generative sequence form and used as analytical tools in the manner incorporated into Part C.5 of Chapter 5, thus allowing a wider application of the same basic method. Although some chains, or parts of chains, occur under more than one chain type heading in Table 6.3 (e.g. between 6-7 and octatonic, reflecting the areas of overlap between aggregate types), the expanded patterns of generative sequence labelled (2) support an inbuilt network of relationships which enable clear choices to be made between systems or genera where a collection of related pc sets might otherwise be equivocal; in this respect, analytical method remains contextual, although no longer merely 'customised' to fit a single work or composer, and stays sufficiently flexible to reflect overall patterns of pitch organisation and also more localised shifts and relationships.

⁵¹R. S. Parks, 'Pitch-Class Set Genera: My Theory, Forte's Theory', *op. cit.*, pages 207 and 209; A. Forte, 'Pitch-Class Set Genera and the Origin of Modern Harmonic Species', *op. cit.*, pages 192 and 234-235.

While Chapter 5's Sequences A to K remain appropriate to Opus 5 (because they arose directly out of the work), the chain modifications can throw new light on Opus 2, No. 4's related groups in bars 1-2, 11-12 and 20-22 (shown in Example 2.6). The pertinent sets, 4-Z15/Z29 and 5-20 and their complements, have been identified as Sequence G members (in Section 2 of this chapter). The 5-20 component of bars 1-2 and 7-20/5-32 components of bars 20-24 can be matched to the G(2) chains of the hexatonic genus, through the presence of 4-20 in the opening chord (Example 2.5c) and through the close proximity of 4-20 and 4-17 in the hexatonic chords of bars 22-24 (Example 2.5a), while the 4-Z15/4-Z29/7-20 grouping in bars 11-12 shows octatonic as well as hexatonic leanings, due to the presence of 4-17 and the close proximity of several instances of 4-7 (Examples 2.4a and 2.5d). But an alternative diatonic K(2) reading can also be posited, since 4-Z15/Z29 and 5-20, together with the 5-32 of bar 22, occur in the diatonic genus, confirming the suspicion that the perfect fifth-based chords and the fourths-cycle progression in this song must have a degree of diatonicism in their constitution.

This new chain-induced genera system, based as it is on symmetrical and transpositionally or inversionally invariant hexachords, may seem inapplicable as a premise for all atonal repertoires, yet the genera do seem to correlate closely to many of the collections of significant sets assigned by Forte to the works analysed by him for the final part of the exposition of his own genera:⁵² Schoenberg's Opus 11/1 and Carter's Concerto for Orchestra/1 occupy the hexatonic genus almost exclusively (pages 238-240 and 249-251), Stravinsky's Symphony of Psalms/1 is almost wholly contained within the chromatic genus (pages 252-253), and others can be assigned an amalgam of just two or three genera, (i.e. Ravel's *Trois Poèmes de Mallarmé*/3, pages 238-241, Messiaen's *Catalogue d'Oiseaux*/6, pages 244-246, Webern's Opus 10/5, pages 247-248, and Debussy's *La Terrasse des Audiences du Clair de Lune*, pages 254-252).

⁵²Ibid., pages 235-263.

It can be seen that Berg's later works in some respects formalise and make more rigorous his earlier pitch-organisational practices, although it remains open to question whether this formalisation represents a rationalisation of formerly incompletely-realised procedures, or whether the later works contrive to accommodate the earlier practices because these routines have become permanent and indispensable aspects of his style. Jarman and Perle tend towards the former interpretation: Jarman remarks that Berg's adoption of Schoenberg's twelve-note method provided a means towards *codifying* some of his earlier techniques, both formal and organisational;⁵³ Berg's own 'master array' of 1920 certainly codifies one particular procedure, the systematic arrangement of all of the interval cycles, a part of which can be found compositionally in the contemporary *Wozzeck*⁵⁴ (and was previously found in embryo in the second movement of the Opus 3 String Quartet, in bar 153, shown in Example 3.23i), and alternate rows from which inform the vertical/horizontal mix of intervals found in Opus 3/1 (described in Part C.2 of Chapter 3, and shown in Table 3.1). Perle sees a 'transformation' and a 'radical departure in ... technique' in the later works, with a new objectivity in the Chamber Concerto.⁵⁵ Further support for the latter view is supplied by Adorno, who sees the Chamber Concerto as being transitional, with 'new' layers which are no longer superfluously expressionistic, but rather offering an 'As If' solution in its design, so that technical parameters are often incorporated 'playfully' and epigrammatically.⁵⁶ Yet Perle also appears to acknowledge the other, reactive view, noting in *Lulu* a 'pervasive harmonic texture to which the sets themselves are subordinate', and 'a pervasive harmonic context, a frame of reference within which [cell-derived, series-derived and trope-derived] themes and motives move and act.'⁵⁷

⁵³Ibid., page 79.

⁵⁴In Act 2, Scene 3, bar 380, quoted in G. Perle: *The Operas of Alban Berg: Wozzeck*, op. cit., page 125.

⁵⁵*The Operas of Alban Berg: Volume Two 'Lulu'* op. cit., page 1.

⁵⁶Op. cit., page 89.

⁵⁷G. Perle, *ibid.*, pages 86-87.

If it follows from the above that a codification of Berg's techniques in the earlier atonal works is more problematic, then this is not for reasons of lack of organisation or paucity of thought in these works, but is rather precisely because of the richness and complexity of ideas, and the width and abundance of gesture arising from the expressionist perspective. In many respects Berg's handling of symmetrically-derived procedures is *more* remarkable in these earlier works, both in the creative and innovative manner of their emergence, and in the intense way in which they are incorporated into individual pieces' developmental or expressive *milieu*, such that 'the effect of "normal" harmonic continuity'⁵⁸ (i.e. that previously achieved by triadic means in tonal music) can be manufactured to provide 'smooth' voice-leading⁵⁹ and to define structural points of reference.

Ultimately, pitch organisation in Opus 2-5 ranges between two poles: it is represented at one extreme by the many instances of closed elements or systems (or parts thereof) such as referential motives and pitches, invariant intervallic cells, sum-symmetrical wedge formations, interval cycles, TINVs, aggregate systems, and genera-based associations, while the other limit is occupied by a tendency towards *non*-repetition and *non*-reference, and a free and comprehensive use of as wide a variety of intervallic types as possible,⁶⁰ reflecting an intent to emancipate all structural parameters from traditional norms. Within these bounds, uniting both closed systems and free intervallic arrangements, sit the various types of organisational network described in the 'C' sections of Chapters 3-5, embracing transformational and 'modulatory' patterns, and the modelling of interactive juxtapositions or superimpositions of codifiable material, thus permitting the portrayal of an extensive assemblage of divergent or linked modes of correlation: herein lies the key to Berg's ingenious and singular approach to free atonality.

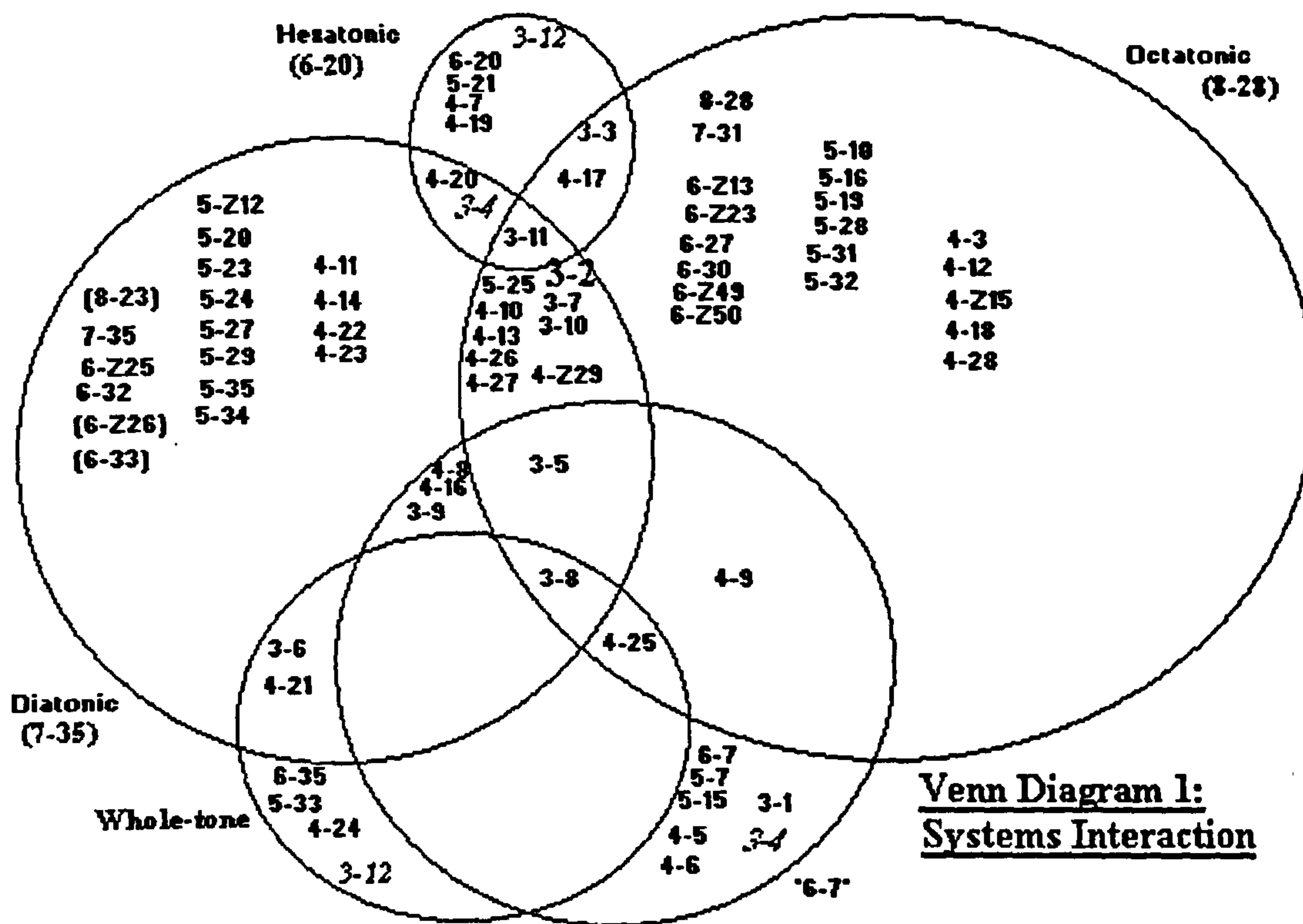
⁵⁸G.Perle, *Serial Composition and Atonality*, op. cit., page 24; the point is repeated in his *The Operas of Alban Berg: 'Wozzeck'*, op. cit., page 11.

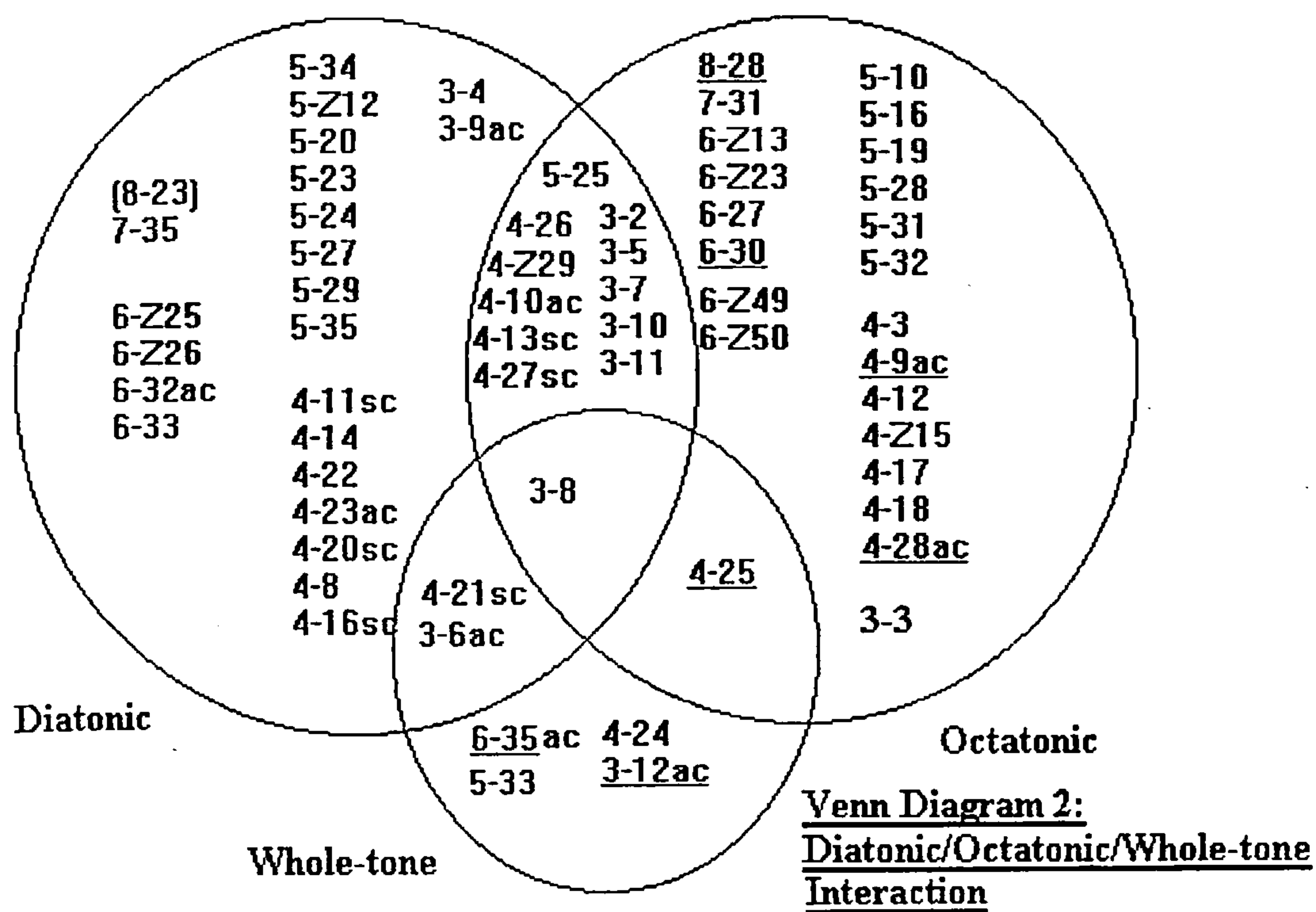
⁵⁹*Ibid.*, page 24.

⁶⁰This tendency towards intervallic diversity is evident in the near-comprehensiveness of the intervallic cell shape types in Opus 5, a corollary of which emerges in the equally-comprehensive intervallic structures found in the various series used in *Lulu*, and in the 'all-interval' series used in the first movement of the Lyric Suite.

Table 3.1: Vertical even-numbered intervals vs. horizontal odd-numbered intervals

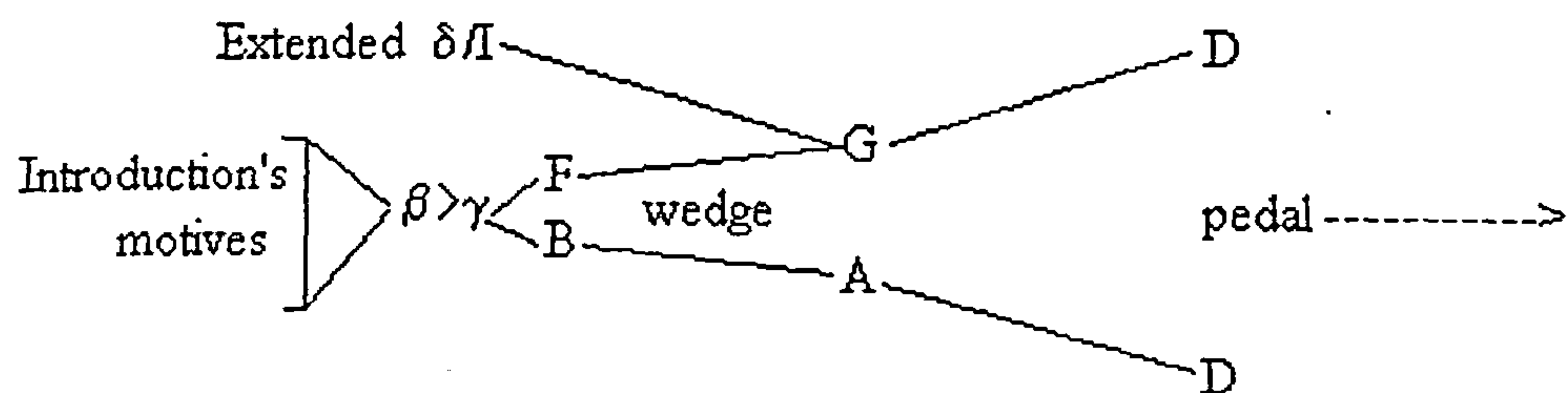
	unisons (ic 0)	tones (ic 2)	major 3rds (ic 4)	tritones (ic 6)	minor 6ths (ic 8)	minor 7ths (ic 10)	octaves (ic 12/0)
linear major 7ths (ic 11)	C	B	Bb	A	G#	G	F#
linear major 6ths (ic 9)	C	A	F#	Eb	C	A	F#
linear fifths (ic 7)	C	G	D	A	E	B	F#
linear fourths (ic 5)	C	F	Bb	Eb	G#	C#	F#
linear minor 3rds (ic 3)	C	Eb	F#	A	C	Eb	F#
linear semitones (ic 1)	C	C#	D	Eb	E	F	F#





Theme	bars 1-5	β	
Var 1	bars 6-10	δ/α	
Var 2	bars 11-15	$\varepsilon >> \zeta, +\delta/\beta$	
Var 3	bars 16-20	ζ ('Hier ist Friede') RIT.	
Var 4	bars 21-25	development of β /vocal δ	
Var 5	bars 26-30	development of β/δ	
Var 6	bars 31-35	$\delta/\beta/\alpha$ ACCEL.	
Var 7	bars 36-40	$\varepsilon >> \zeta$ ('Hier ist Friede'), $+\beta$	
Var 8	bars 41-45	vocal δ/α	
Var 9	bars 46-50	β	
Var 10	bars 51-55	coda ($\gamma >> \beta$)	

Table 4.1: Arch form in Opus 4, No. 5



bar 1 bar 9 bar 15 bar 17 bar 18 bar 24 bar 34

Table 4.2: Long-term links in Opus 4, No. 1

shape cells

'common' tetrachords

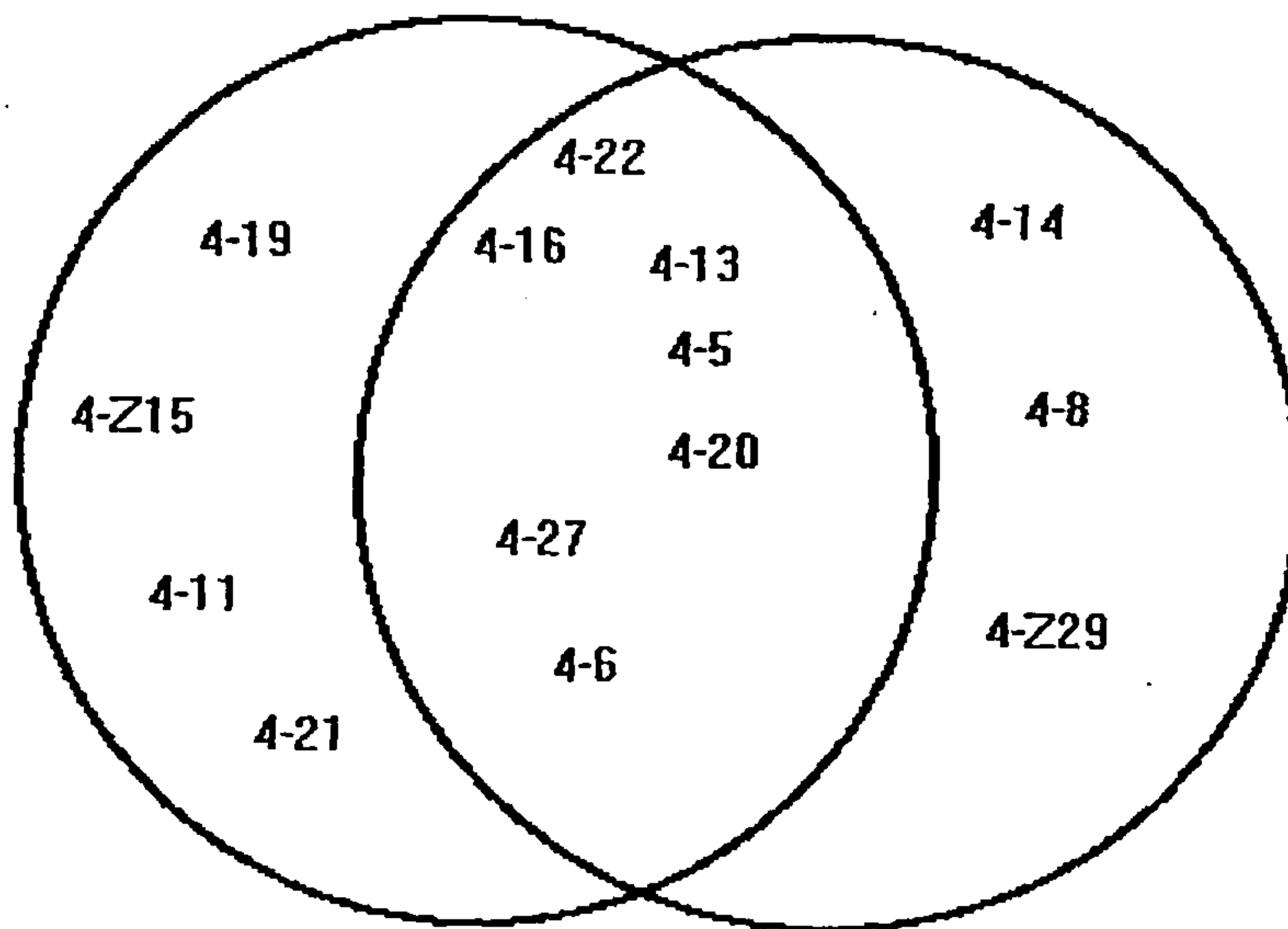


Table 5.1: Significant tetrachords in Opus 5

Table 5.2: Aggregate systems interaction in Berg's Opus 5

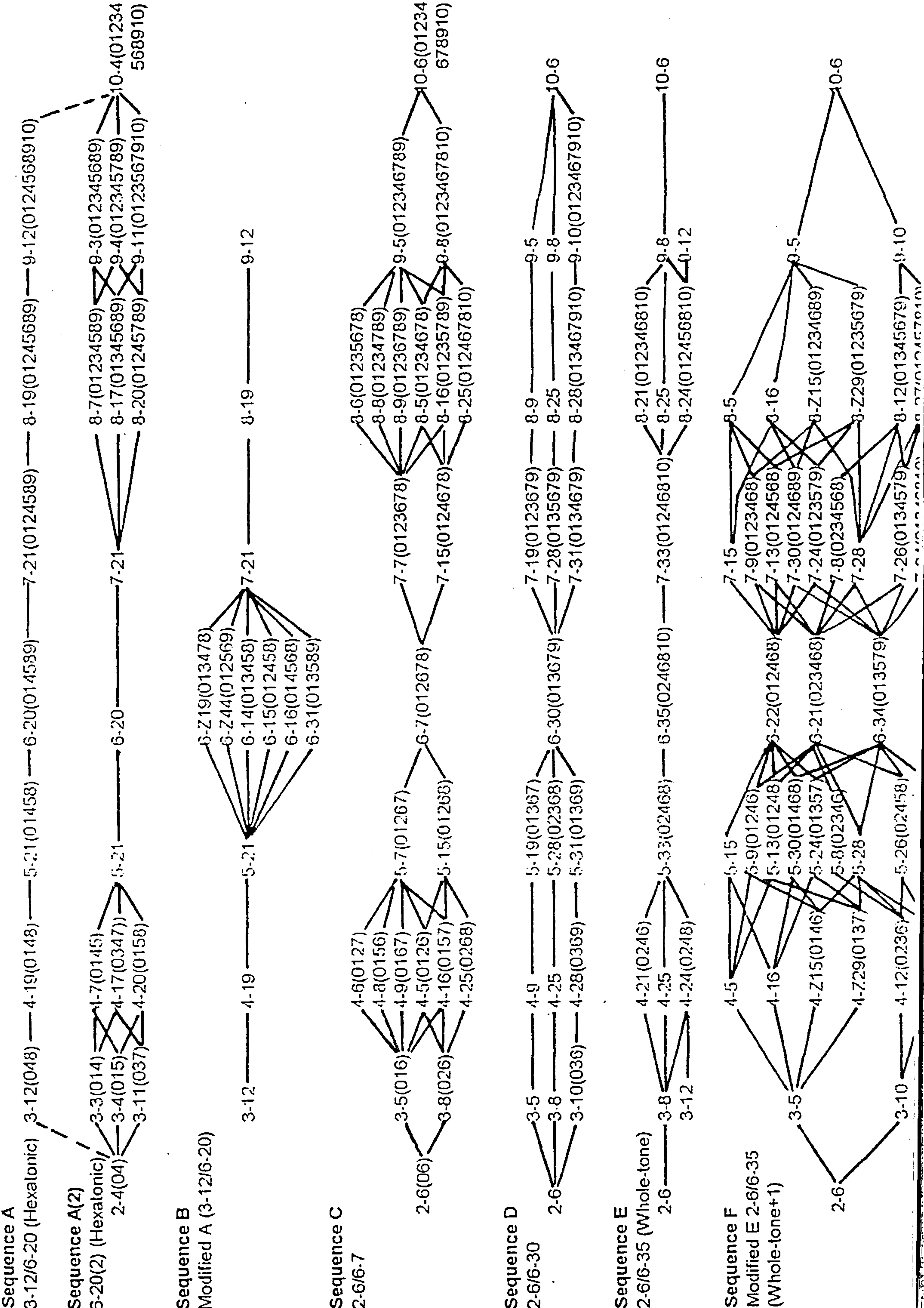
Pc set names	Diatonic	Octatonic	Whole-tone	6-7	Hexatonic	6-Z19/Z44	7-21	Atonal
3-1 (cell I)			(WT+1)	6-7		6-Z19/Z44	7-21	A
3-2 (cell XI)	D	O	(WT+1)			6-Z19/Z44	7-21	A
3-3 (cell III)		O	(WT+1)	H		6-Z19/Z44	7-21	A
3-4 (cell II)	D		(WT+1)	6-7	H	6-Z19/Z44	7-21	A
3-5 (cell IV)	D	O	(WT+1)	6-7		6-Z19/Z44	7-21	A
3-6 (cell XII)	D		WT				7-21	A
3-7 (cell VIII)	D	O	(WT+1)			6-Z19/Z44	7-21	A
3-8 (cell X)	D	O	WT	6-7		6-Z19/Z44	7-21	A
3-9 (cell IX)	D		(WT+1)	6-7		6-Z19/Z44	7-21	A
3-10 (cell VII)	D	O	(WT+1)			6-Z19/Z44	7-21	A
3-11 (cell V)	D	O	(WT+1)		H	6-Z19/Z44	7-21	A
3-12 (cell VI)			WT		H	6-Z19/Z44	7-21	A
4-1								A
4-2			(WT+1)				7-21	A
4-3		O				6-Z19/Z44	7-21	A
4-4						6-Z19/Z44	7-21	A
4-5*			(WT+1)	6-7		6-Z19/Z44	7-21	A
4-6*				6-7			7-21	A
4-7*					H	6-Z19/Z44	7-21	A
4-8*	D			6-7		6-Z19/Z44	7-21	A
4-9		O		6-7				A
4-10	D	O						A
4-11*	D		(WT+1)				7-21	A
4-12		O	(WT+1)			6-Z19/Z44	7-21	A
4-13*	D	O						A
4-14*	D					6-Z19/Z44	7-21	A
4-15*		O	(WT+1)			6-Z19/Z44	7-21	A
4-16*	D		(WT+1)	6-7		6-Z19/Z44	7-21	A
4-17		O			H	6-Z19/Z44	7-21	A
4-18		O				6-Z19/Z44	7-21	A
4-19*			(WT+1)		H	6-Z19/Z44	7-21	A
4-20*	D				H	6-Z19/Z44	7-21	A
4-21*	D		WT					A
4-22*	D		(WT+1)				7-21	A
4-23	D							A
4-24			WT				7-21	A
4-25		O	WT	6-7				A
4-26	D	O				6-Z19/Z44	7-21	A
4-27*	D	O	(WT+1)			6-Z19/Z44	7-21	A
4-28		O						A
4-29*	D	O	(WT+1)			6-Z19/Z44	7-21	A
5-1								A
5-2								A
5-3*						6-Z19/Z44	7-21	A
5-4								A
5-5*								A
5-6						6-Z19/Z44	7-21	A
5-7*				6-7				A
5-8			(WT+1)					A
5-9			(WT+1)					A
5-10		O						A
5-11							7-21	A

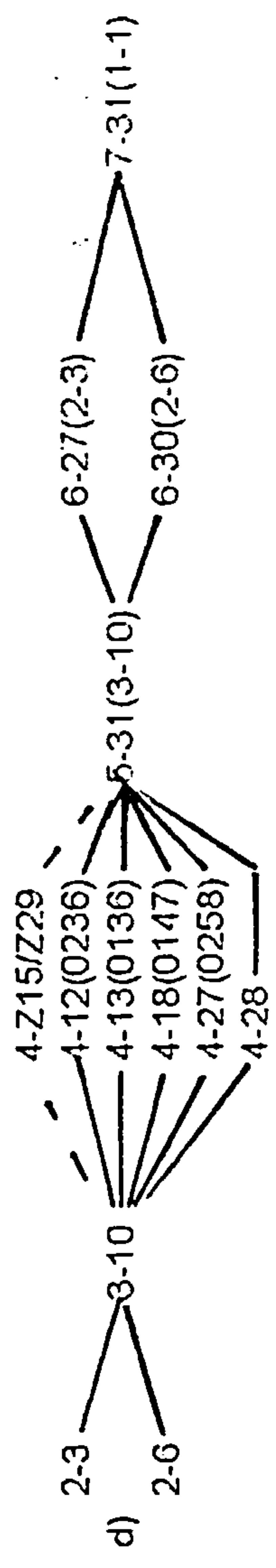
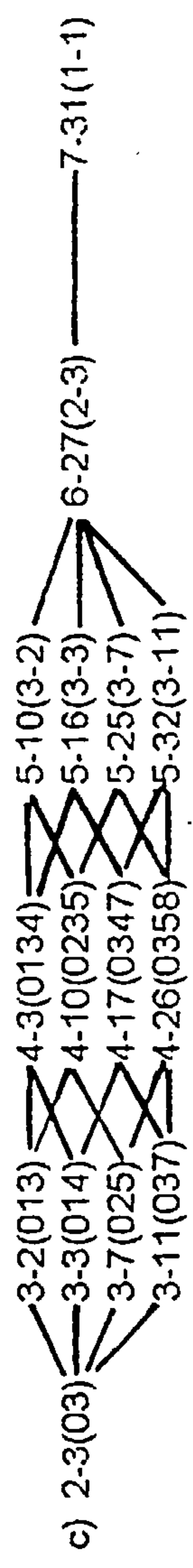
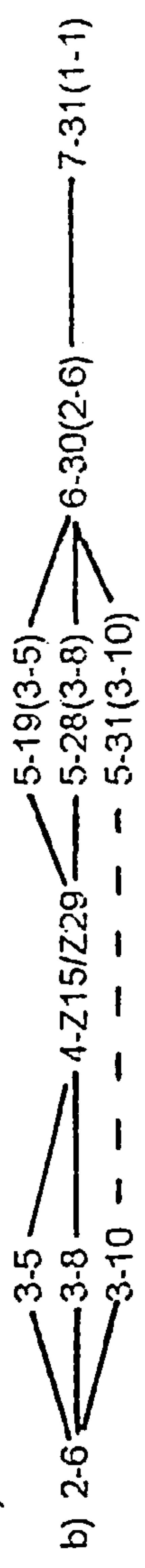
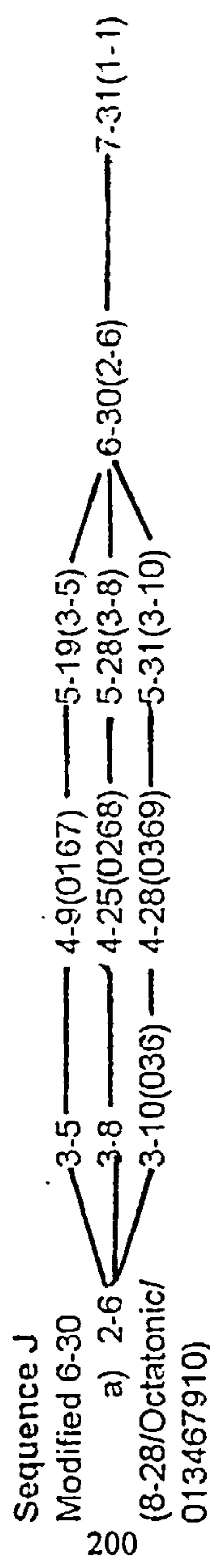
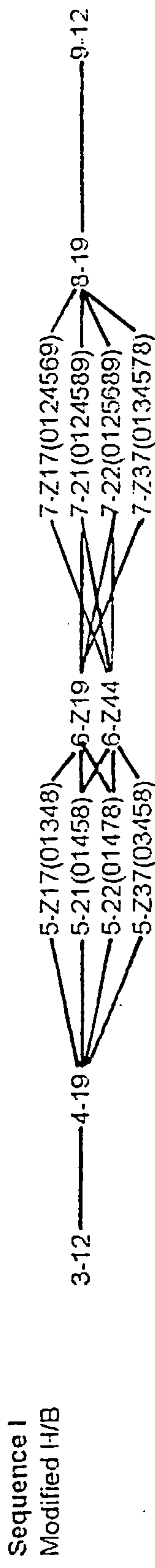
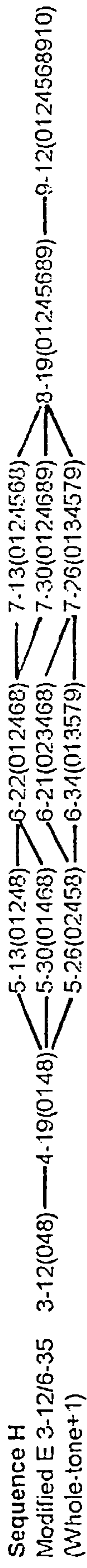
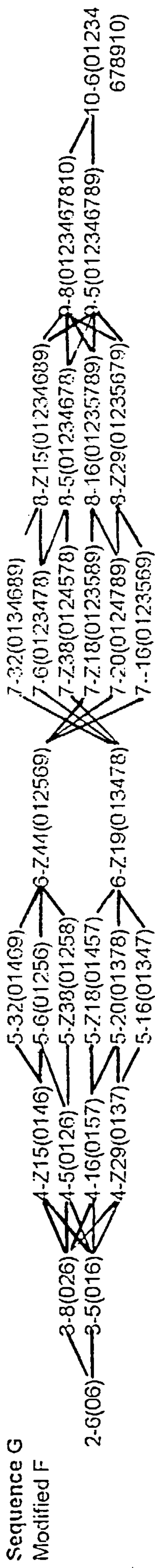
Pc set names	Diatonic	Octatonic	Whole-tone	6-7	Hexatonic	6-Z19/Z44	7-21	Atonal
5-Z12	D							A
5-13*			(WT+1)				7-21	A
5-14								A
5-15*			(WT+1)	6-7				A
5-16		O				6-Z19/Z44	7-21	A
5-Z17*						6-Z19/Z44	7-21	A
5-Z18*						6-Z19/Z44	7-21	A
5-19		O						A
5-20*	D					6-Z19/Z44	7-21	A
5-21*				H		6-Z19/Z44	7-21	A
5-22						6-Z19/Z44	7-21	A
5-23*	D							A
5-24*	D		(WT+1)					A
5-25	D	O						A
5-26			(WT+1)				7-21	A
5-27*	D						7-21	A
5-28		O	(WT+1)					A
5-29	D							A
5-30			(WT+1)				7-21	A
5-31*		O						A
5-32		O					7-21	A
5-33			WT					A
5-34*	D		(WT+1)					A
5-35	D							A
5-Z36*								A
5-Z37						6-Z19/Z44	7-21	A
5-Z38						6-Z19/Z44	7-21	A
6-1								
6-2								A
6-Z3/Z36								A
6-Z4/Z37								A
6-5								
6-Z6/Z38								A
6-7				6-7				
6-8								
6-9								A
6-Z10/Z39								A
6-Z11/Z40								A
6-Z12/Z41								A
6-Z13/Z42		O(Z13 only)						A(Z42 only)
6-14							7-21	
6-15							7-21	A
6-16							7-21	A
6-Z17/Z43								A
6-18								A
6-Z19/Z44						6-Z19/Z44	7-21	A
6-20				H			7-21	
6-21			(WT+1)				7-21	A
6-22			(WT+1)					A
6-Z23/Z45		O(Z23 only)						A(Z45 only)
6-Z24/Z46								A
6-Z25/Z47	D(Z25 only)							A
6-Z26/Z48	D(Z26 only)							A

Pc set names	Diatonic	Octatonic	Whole-tone	6-7	Hexatonic	6-Z19/Z44	7-21	Atonal
6-27		O						A
6-Z28/Z49		O(Z49 only)						A(Z28 only)
6-Z29/Z50		O(Z50 only)						A(Z29 only)
6-30		O						A
6-31							7-21	A
6-32	D							
6-33	D							A
6-34			(WT+1)					A
6-35			WT					
7-5								A
7-6								A
7-9								A
7-10								A
7-13								A
7-16								A
7-19								A
7-20								A
7-21							7-21	
7-24								A
7-28								A
7-30								A
7-31		O						
7-32								A
7-33			(WT+1)					
7-35	D							
8-Z15/Z29								A
8-28		O						

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Table 5.3: Generative Sequences of Inclusion and Complementation





Sequence K
3-23 (Diatonic)

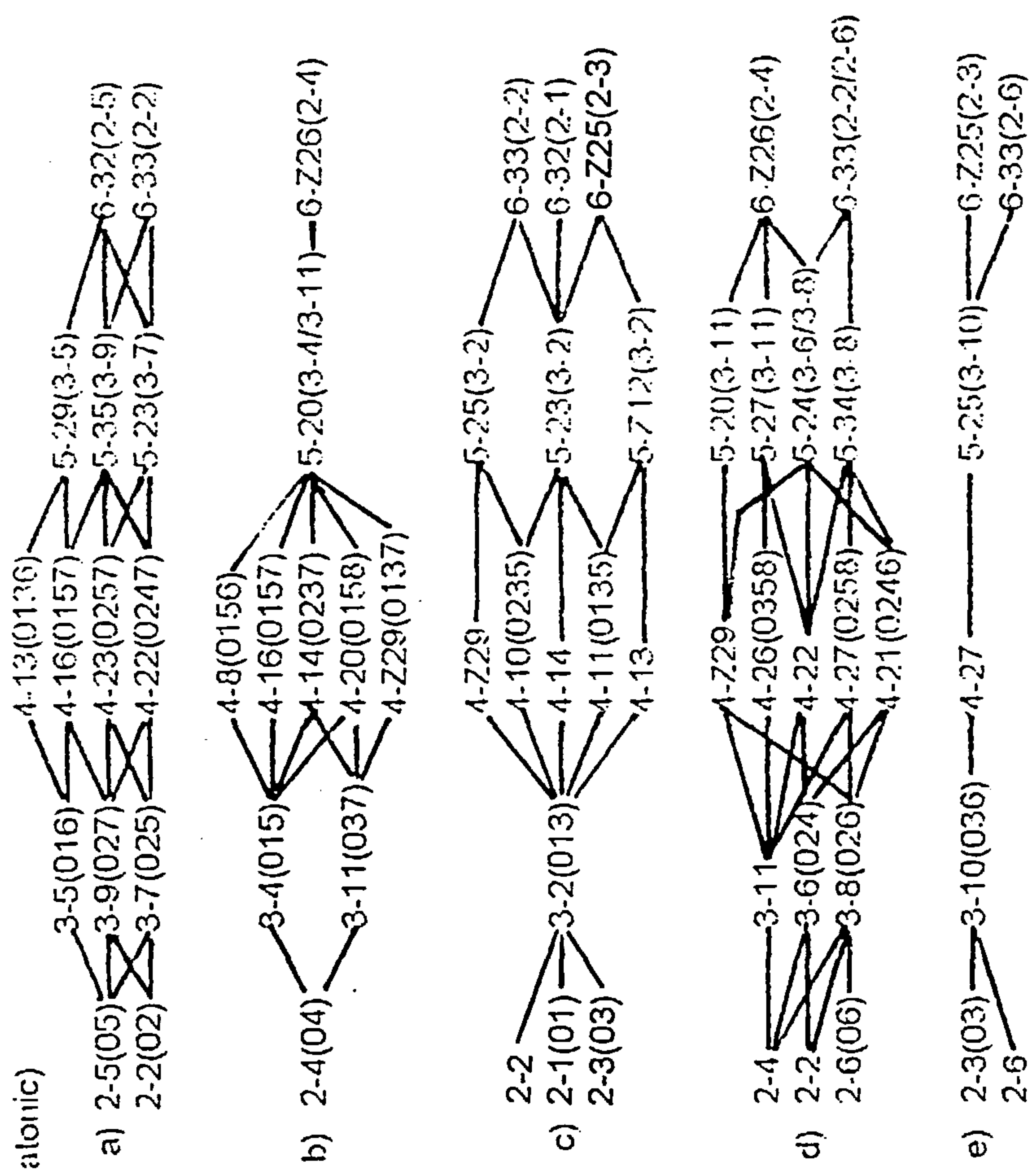


Table 5.4: Generative Inclusion Sequences in Op. 5

	<u>First section</u>					<u>Middle section</u>		<u>Third section</u>	
Piece No. 1	G	F	CG	CFI	F	I	FI	CFI	CFIG
		A		A	A(2)	A(2)	A	A	
		B		B	B	B		B	B
									K
		H				H	H	H	H
Piece No. 2						J		(A)	
	F					F			
	G								
						K			
						F			
Piece No. 3	ABI	B		BI	ABI	I		I	ABI
	G	J			E	G	DJ	G	G
	F		FEC					F	E
				K				C	C
								K	G
Piece No. 4	AB		C			F		F	A(2)B
						K		K	K
						E			A2
								I	

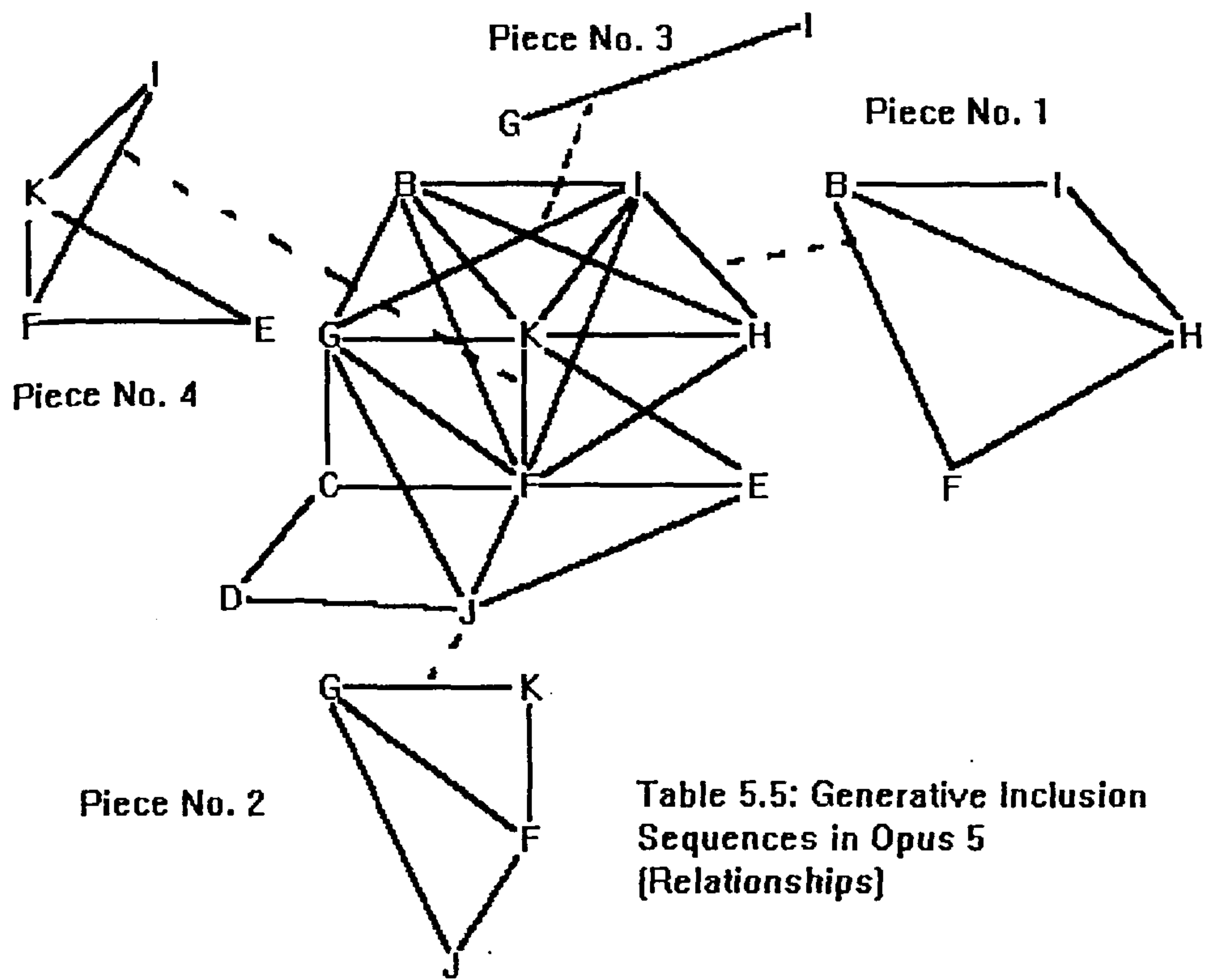


Table 5.5: Generative Inclusion Sequences in Opus 5 (Relationships)

Table 2
Hexachord families of equivalence/similarity

<u>6-20</u> A/B(I)	<u>0,1,4,5,8,9</u>	<u>6-7</u> C	<u>0,1,2,6,7,8</u>	<u>6-30</u> D(J)	<u>0,1,3,6,7,9</u>	<u>6-35</u> E(F/H)	<u>0,2,4,6,8,10</u>	<u>6-32</u> K	<u>0,2,4,5,7,9</u>	<u>6-1</u> <u>0,1,2,3,4,5</u>		
<u>6-Z19</u>	<u>0,1(-2),3,4,7,8</u>	5-21	<u>6-Z6</u> <u>0,1,2,5(+3),6,7</u>	5-7	<u>6-Z12</u> <u>0,1,2(-4),4,6,7</u>	5-19	0,2,3(-5),4,6,8	5-33	<u>6-Z24</u> <u>0(-1),1,3,4,6,8</u>	5-23	<u>6-Z3</u> <u>0,1,2,3,5,6(-2)</u>	5-2
<u>6-Z44</u>	<u>0(-2),1,2,5,6,9</u>	5-21	<u>6-Z38</u> <u>0,1,2,3(+3),7,8</u>	5-7	<u>6-Z41</u> <u>0,1(-4),2,3,6,8</u>	5-28	0,1(-3),2,4,6,8	5-33	<u>6-Z46</u> <u>0(-1),1,2,4,6,9</u>	5-27	<u>6-Z36</u> <u>0,1,2,3,4,7(-2)</u>	5-1
6-14	0,1,3(+/-6),4,5,8	5-21	6-Z12	0,1,2,4(+4),6,7	5-7	<u>6-Z13</u> <u>0,1,3,4(+5),6,7</u>	5-19		<u>6-Z25</u> <u>0(-2),1,3,5,6,8</u>	5-23	<u>6-Z4</u> <u>0,1,2,4,5,6(-3)</u>	5-3
6-15	0,1,2(-5),4,5,8	5-21	6-Z41	0,1,2,3(+4),6,8	5-15	<u>6-Z42</u> <u>0,1,2(+5),3,6,9</u>	5-31		<u>6-Z47</u> <u>0,1(-2),2,4,7,9</u>	5-35	<u>6-Z37</u> <u>0,1,2,3,4,8(-3)</u>	5-1
<u>6-16</u>	<u>0,1,4,5,6(+3),8</u>	5-21										
6-31	0,1,3(+1),5,8,9	5-21	6-Z17	0,1,2,4(+2),7,8	5-7	6-Z17	0(-2),1,2,4,7,8	5-19	<u>6-Z26</u> <u>0,1(-3),3,5,7(+3),8</u>	5-27	<u>6-Z10</u> <u>0,1,3,4,5,7(-5)</u>	5-3
			6-Z43	0,1,2,5(+2),6,8	5-15	6-Z43	0,1(-2),2,5,6,8	5-28	<u>6-Z48</u> <u>0,1(+/-3),2,5,7,9</u>	5-35	<u>6-Z39</u> <u>0,2,3,4,5,8(-5)</u>	5-2
			6-5	0,1,2,3(+5),6,7	5-7	<u>6-Z23</u> <u>0,2,3,5(+4),6,8</u>	5-28	6-8	0,2,3(+/-6),4,5,7	5-23	<u>6-Z11</u> <u>0,1,2,4,5,7(-4)</u>	5-3
			6-18	0,1,2,5(+1),7,8	5-7	<u>6-Z45</u> <u>0,2,3,4(+4),6,9</u>	5-31	6-9	0,1(-3),2,3,5,7	5-23	<u>6-Z40</u> <u>0,1,2,3,5,8(-4)</u>	5-2
			6-22	0,1,2,4(+3),6,8	5-15			6-14	0,1,3,4(+/-6),5,8	5-27		
						<u>6-Z28</u> <u>0,1,3,5(+2),6,9</u>	5-31	6-31	0,1,3,5,8,9(+1)	5-27	<u>6-2</u> <u>0(+5),1,2,3,4,6(-1)</u>	5-1/5-2
						<u>6-Z49</u> <u>0,1,3,4(+2),7,9</u>	5-28	<u>6-33</u>	<u>0,2,3(+1),5,7,9(+1)</u>	5-23/5-35	6-8	0(+/-6),2,3,4,5,7(+/-6)
						<u>6-Z29</u> <u>0,1,3,6,8(-1),9</u>	5-31				6-9	0,1,2,3,5,7(-3)
						<u>6-Z50</u> <u>0,1,4(-1),6,7,9</u>	5-19				6-14	0,1,3,4,5,8(+/-6)
											6-15	0,1,2,4,5,8(-5)
			6-5	0,1,2(-5),3,6,7	5-19							
			6-18	0(-1),1,2,5,7,8	5-19							
			6-21	0,2,3,4(+5),6,8	5-28							
			<u>6-27</u>	<u>0,1(-3),3,4(+3),6,9</u>	5-31							
			6-34	0,1,3,5(+1),7,9	5-28							

Table 6.1: Scaic and Zigzag patterns

Pattern	Generator	Interval	3/4-note sets	5/6-note sets	Typical shape	Op. 5 cell	Op. 3 motives	Op. 4 motives
Octatonic/1	2-6	(1-5)(1^7)	3-5/4-9		(5-1-5)	b3		α,ε
Octatonic/2	2-6	(3-3)(3^9)	3-10/4-28		(3-3-3)	VIIb	a1	
Octatonic/3	2-6	(2-4)(2^8)	3-8/4-25		(2-4-2)	Xa,Xb		
Octatonic/4	3-10	(1-8)(1^4)	3-3/4-17/4-3	5-16	(4^1 4)	IIIc		δ,ε
Octatonic/5	3-10	(2-7)(2^5)	3-7/4-26/4-10	5-25	(10^1)	VIIIb	a2	
Octatonic/6	3-10	(1-2)(1^10)	3-2/4-3/4-10	5-10	(7-8)	XIb	b4	
Octatonic/7	3-10	(4-5)(4^7)	3-11/4-26/4-17	5-32	(3-6-3-6)	Vc,Vd		
Octatonic/8	3-10	(3-6)(3^6)	3-10/4-28		(1^5 1)	VIIa		
Hexatonic/1	3-12	(1-7)(1^5)	3-4/4-7/4-20	5-21		IIc,IId	'anticipatory'	
Hexatonic/2	3-12	(3-5)(3^7)	3-11/4-17/4-20	5-21	(3-1-3)	Vb		
Hexatonic/3	3-12	(1-3)(1^9)	3-3/4-7/4-17	5-21	(2-2-2)	IIIb	a3,'ritornello'	
Whole-tone/13-12		(2-2)(2^10)	3-6/4-21	5-33	(6^2 6)	XIIb	a1,'sextuplet','lyrical'	
Whole-tone/23-12		(2-6)(2^6)	3-8/4-21/4-25	5-33	(2^4 2)	Xc		
Whole-tone/33-6		(2-8)(2^4)	3-6/4-21	5-33	(6-4-6)	XIIa		
Whole-tone/43-6		(4-6)(4^6)	3-8/4-21/4-25	5-33	(6-5-6)	Xd,Xe,'4-21 a2,'anticipatory'		ζ
6-7/1	3-1	(5-6)(5^6)	3-5/4-9/4-8	5-7	(1-6^1 1)	IVa,IVd	I/VI,V/IX,'marcato'	
6-7/2	3-9	(1-6)(1^6)	3-5/4-9/4-8	5-7	(5^4 5)/(4-7)	IVb,IVc		
12-note/1	3-1	(4-7)(4^5)	3-4/4-8/4-7	5-6	(1^3)	IIa	a1,'diatonic','grazioso' α,δ	
Semitone/1	3-6	(1-9)(1^3)	3-2/4-1/4-10	5-2/6-1	(1-1)	XIc,XId	a1	
Semitone/2	3-6	(1-1)(1^11)	3-1/4-1	5-1/6-1	(2^3)	Ib,Ic	a1,'ritornello'	δ
Semitone/3	3-1	(2-9)(2^3)	3-2/4-1/4-3	5-1/6-1	(1^2)	XIa	a1	
Semitone/4	3-1	(1-10)(1^2)	3-1/4-1	5-1/6-1	(3^4)	Ia	b4	δ,ζ
Semitone/5	3-1	(3-8)(3^4)	3-3/4-3/4-7	5-3/6-1	(3-7)	IIIa	a1	
Diatonic/1	3-6	(3-7)(3^5)	3-7/4-10/4-23	5-23/6-32	(2-3)	VIIa	'lyrical'	
Diatonic/2	3-9	(2-3)(2^9)	3-7/4-26/4-23	5-35/6-32	5-20/6-Z26/6-Z38(1-4-1)/(4-1-4),IIb			
Diatonic/3	3-9	(1-4)(1^8)	3-4/4-20/4-8	5-27/6-Z26/6-32	(4-3-4)	Va,'4-20'	'sextuplet'	
Diatonic/4	3-9	(3-4)(3^8)	3-11/4-20/4-26	5-35/6-32	(5-5-5)	IXb	a1	α
Diatonic/5	3-6	(5-5)(5^7)	3-9/4-23	5-35/6-32	(5-2-5)	IXa	b4	
Diatonic/6	3-9	(2-5)(2^7)	3-9/4-23		(4^8)	VIIa,VIIb	'ritornello'	ε
Augmented/13-12		(4-4)(4^8)	3-12		(1-2-3)	'4-13'		
6-30/1	2-6	(1-2-3)	3-3/3-7/4-13/4-Z15/4-12	5-19/5-28/5-31	(5-1-1)			
12-note/2	3-9	(1-1-5)	3-1/3-5/4-6/4-9	5-7/6-Z6/6-7				

Table 6.2: Diverging/converging interval cycle patterns

<u>Pattern groups</u>	<u>Generator</u>	<u>Interval pattern</u>	<u>odd/even</u>	<u>3/4-note sets</u>	<u>5-note sets</u>	<u>aggregate</u>
Octatonic/1	interval-6	1^7^1,5^11^5	odd	3-5,4-9		4-9
Octatonic/2	interval-6	3^9^3	odd	3-10,4-28		4-28
Octatonic/3	interval-6	2^8^2,4^10^4	even	3-8,4-25		4-25
6-7/2,Diatonic/2/3/4/6	interval-5	1^6^11 etc.	odd & even	3-9,3-7,3-11,3-4,3-5,4-23,4-26,4-20,4-8,4-9	5-7/5-20,5-27,5-35	8-23/12-1
Hexatonic/1/2/3	interval-4	1^5^9,3^7^11	odd	3-4,3-11,3-3,4-20,4-7,4-17	5-21	6-20
Whole-tone/1/2	interval-4	2^6^10	even	3-6,3-8,4-25,4-21	5-33	6-35
Augmented/1	interval-4	4^8^0	even	3-12		3-12
Octatonic/4/5/6/7	interval-3	1^4^7^10,2^5^8^11	odd & even	3-2,3-3,3-7,3-11,4-3,4-10,4-17,4-26	5-32,5-25,5-10,5-16	8-28
Octatonic/8	interval-3	3^6^9^0	odd & even	3-10,4-28		4-28
Semitone/1/2,Diatonic/1/5	interval-2	1^3^5^7^9^11	odd	3-2,3-7,3-9,3-1,4-10,4-23,4-1	5-1,5-2/5-32,5-35	12-1
Whole-tone/3/4	interval-2	2^4^6^8^10^12	even	3-6,3-8,4-21,4-25	5-33	6-35
6-7/1,12-note/1,Semitone/3/4/5	interval-1	1^2^3^4^5^6^7^8^9^10^11^12	odd & even	3-1,3-2,3-3,3-4,3-5,4-1,4-3,4-7,4-8,4-9	5-7/5-1,5-3,5-6	12-1

Table 6.3: Generative sequence-related chains of equivalence/similarity

Hexatonic (6-20) Chains

4-7 — 5-3 — 6-14 — 7-3 — 8-7 — G(2)
 5-21 — 6-15 — 7-21 — (S)

4-19 — 5-13 — 6-15 — 7-13 — 8-19 — H(2)
 5-21 — 6-16 — 7-21 — (S)

4-17 — 5-11 — 6-14 — 7-11 — 8-17 — G(2)
 5-21 — 6-16 — 7-21 — (S)

4-19 — 5-30 — 6-16 — 7-30 — 8-19 — H(2)
 5-21 — 6-31 — 7-21 — (S)

4-20 — 5-27 — 6-14 — 7-27 — 8-20 — G(2)
 5-21 — 6-31 — 7-21 — (S)

4-19 — 5-26 — 6-15 — 7-26 — 8-19 — I(2)
 5-21 — 6-31 — 7-21 — (S)

4-7 — 5-6 — 6-16 — 7-20 — 8-20 — G(2)
 5-21 — 6-Z44 — 7-21 — (R)

2-1 — 3-3 — 4-7 — 5-21 — I(2)
 2-4 — 3-4 — 4-19 — 5-Z37
 4-4

4-20 — 5-20 — 6-16 — 7-6 — 8-7 — G(2)
 5-21 — 6-Z19 — 7-21 —

2-4 — 3-4 — 4-20 — 5-21 — I(2)
 2-5 — 3-11 — 4-19 — 5-Z17
 4-14

4-7 — 5-Z18 — 6-31 — 7-32 — 8-17 — G(2)
 5-21 — 6-Z19 — 7-21 — (R)

2-3 — 3-3 — 4-17 — 5-21 — I(2)
 2-4 — 3-11 — 4-19 — 5-22
 4-18

4-17 — 5-32 — 6-31 — 7-Z18 — 8-7 — G(2)
 5-21 — 6-Z44 — 7-21 —

4-17 — 5-16 — 6-15 — 7-Z38 — 8-20 — G(2)
 5-21 — 6-Z19 — 7-21 — (R)

4-19 — 5-22 — 6-Z19 — 7-22 — 8-19 — I(2)
 5-21 — 6-Z44 — 7-21 — (S)

4-20 — 5-Z38 — 6-15 — 7-16 — 8-17 — G(2)
 5-21 — 6-Z44 — 7-21 —

4-19 — 5-Z37 — 6-14 — 7-Z17 — 8-19 — I(2)
 5-21 — 6-Z44 — 7-21 — (R)

2-1 — 3-1 — 4-4 — 5-6 — 6-Z44 — G(2)
 3-4 — 4-5 — 5-Z38 — (S)

4-19 — 5-Z17 — 6-14 — 7-Z37 — 8-19 — I(2)
 5-21 — 6-Z19 — 7-21 —

2-3 — 3-3 — 4-12 — 5-16 — 6-Z19 — G(2)
 3-10 — 4-18 — 5-Z18 — (S)

3-12 — 4-24 — 5-26 — 6-31 — H(2)
 4-19 — 5-30 — (S)

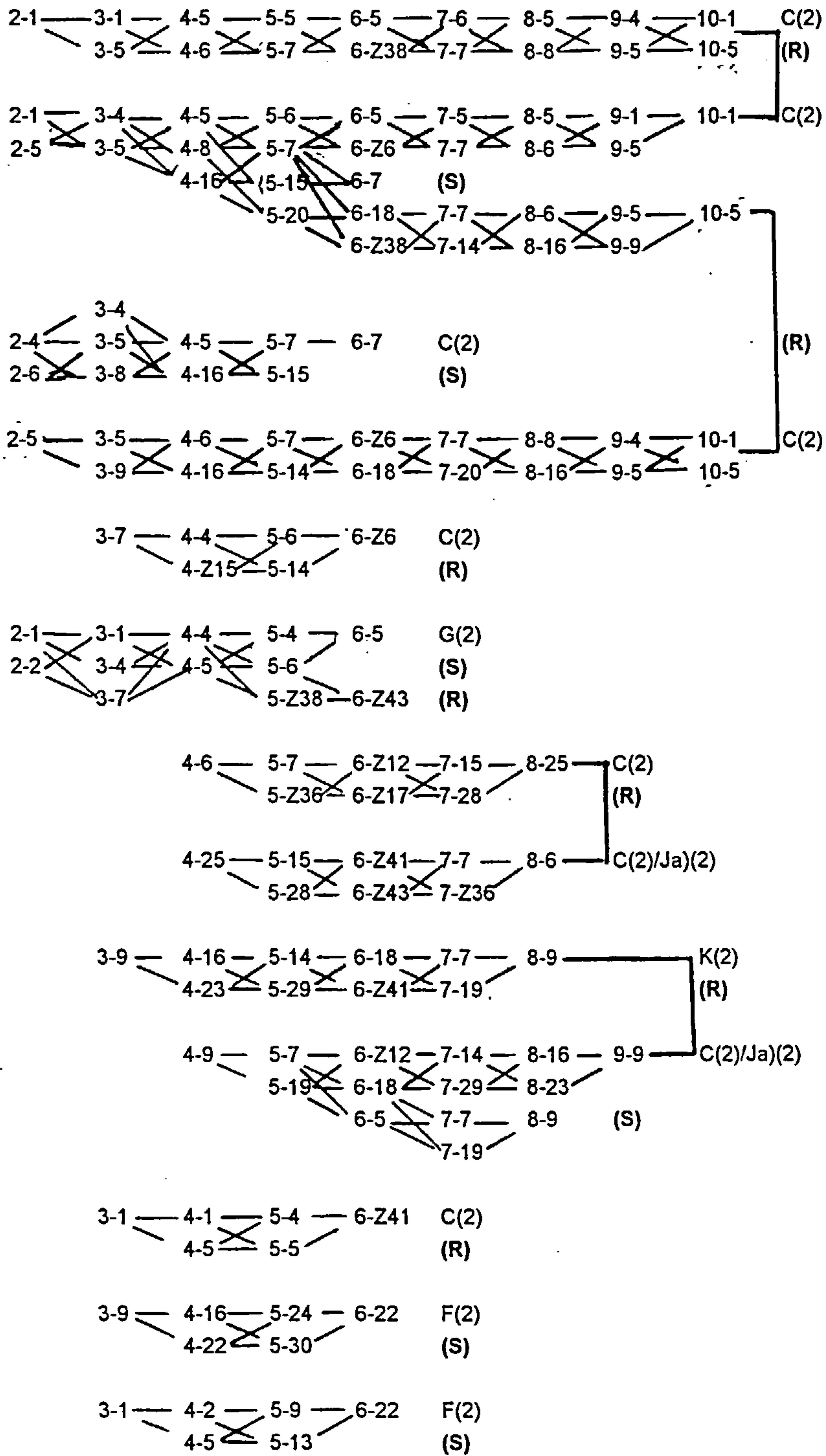
2-3 — 3-10 — 4-18 — 5-32 — 6-Z44 — G(2)/J(2)
 3-11 — 4-27 — 5-Z38 — (S)

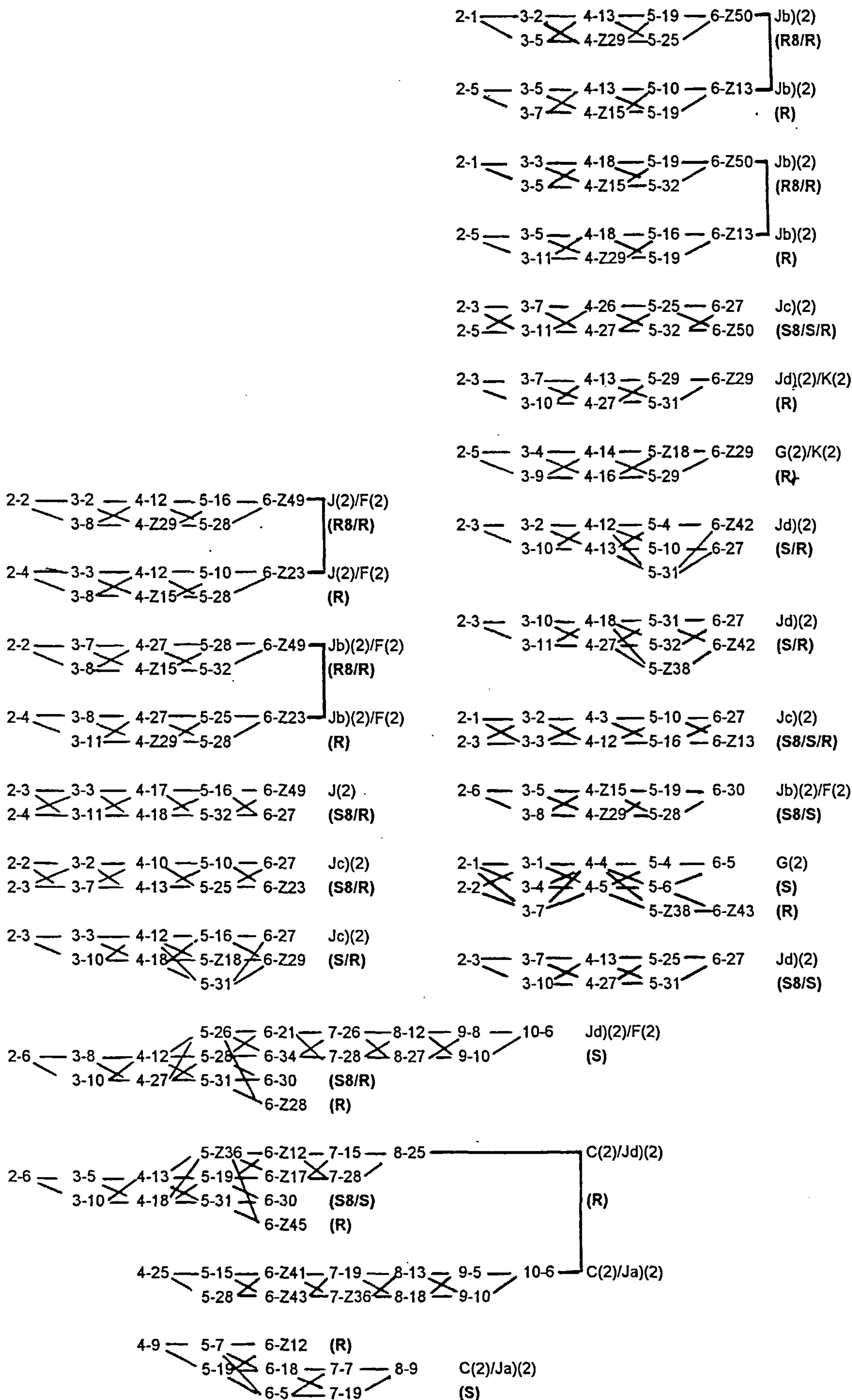
3-12 — 4-24 — 5-13 — 6-16 — H(2)
 4-19 — 5-30 — (S)

2-5 — 3-4 — 4-14 — 5-20 — 6-Z19 — G(2)/Kb(2)
 3-9 — 4-16 — 5-Z18 — (S)

3-12 — 4-24 — 5-13 — 6-15 — H(2)
 4-19 — 5-26 — (S)

6-7 Chains





Whole-tone (6-35) Chains

2-2 — 3-6 — 4-21 — 5-33 E(2)
 2-4 — 3-8 — 4-24

4-25 — 5-28 — 6-21 — 7-28 — 8-25 F(2)
 5-33 — 6-34 — 7-33 (S)

3-6 — 4-21 — 5-9 — 6-21 — 7-9 — 8-21 — 9-6 F(2)
 4-24 — 5-13 — 6-22 — 7-13 — 8-24 (S)

3-6 — 4-2 — 5-8 — 6-21 F(2)
 4-21 — 5-9 (S)

3-6 — 4-21 — 5-24 — 6-34 F(2)
 4-22 — 5-34 (S)

3-6 — 4-11 — 5-9 — 6-22 F(2)
 4-21 — 5-24 (S)

3-8 — 4-12 — 5-26 — 6-21 — 7-26 — 8-12 — 9-8 F(2)
 4-27 — 5-28 — 6-34 — 7-28 — 8-27 (S)

3-8 — 4-16 — 5-24 — 6-22 — 7-24 — 8-16 — 9-8 F(2)
 4-22 — 5-30 — 6-34 — 7-30 — 8-22 (S)

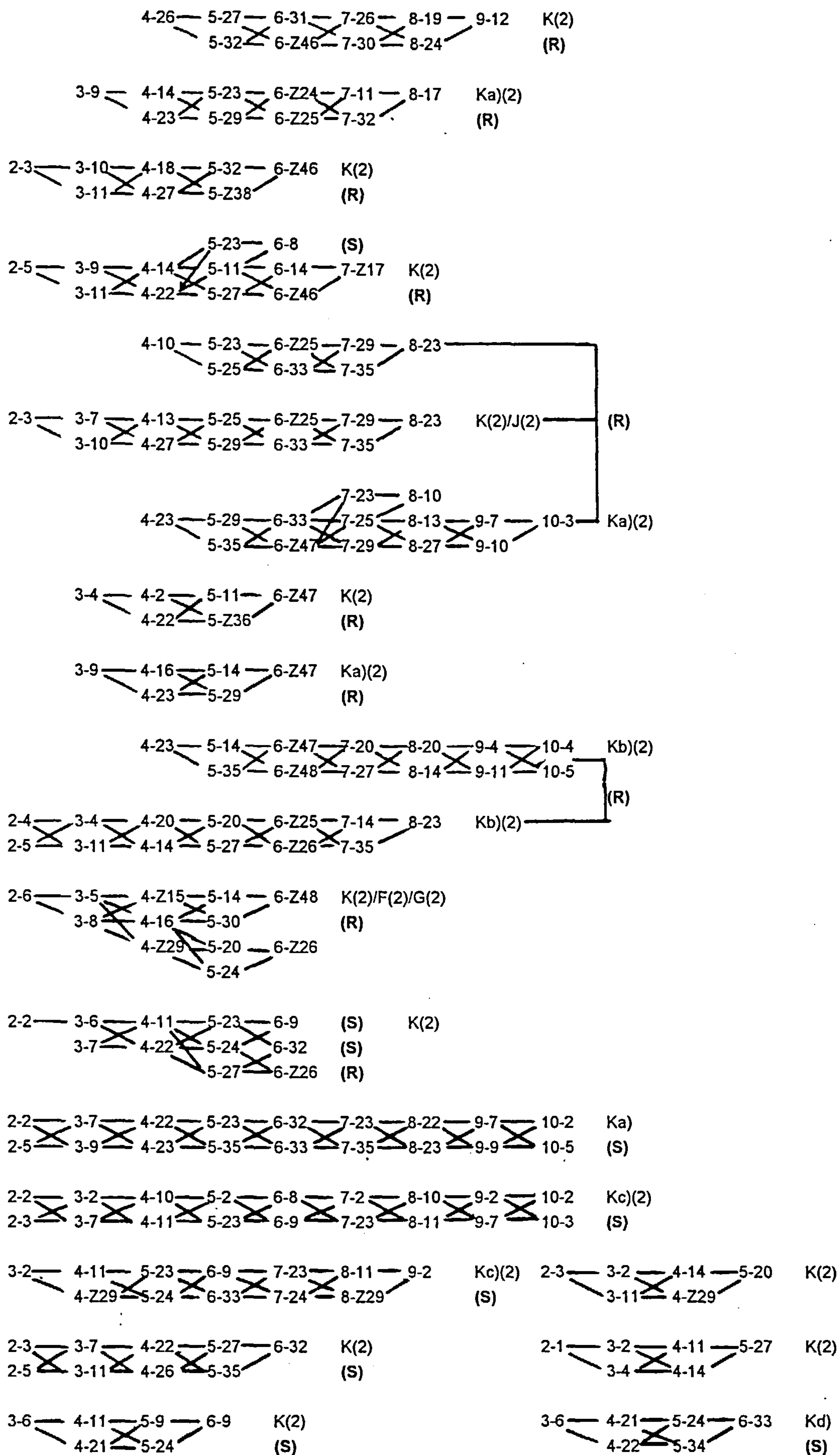
3-12 — 4-19 — 5-13 — 6-21 — 7-13 — 8-19 — 9-12 H(2)
 4-24 — 5-26 — 6-22 — 7-26 — 8-24 (S)
 5-30 — 6-34 — 7-30

4-24 — 5-26 — 6-21 — 7-26 — 8-24 H(2)
 5-33 — 6-34 — 7-33 (S)

4-24 — 5-30 — 6-22 — 7-30 — 8-24 H(2)
 5-33 — 6-34 — 7-33 (S)

4-24 — 5-13 — 6-21 — 7-13 — 8-24 H(2)
 5-33 — 6-22 — 7-33 (S)

Diatonic (6-32) Chains



Chromatic (6-1) Chains

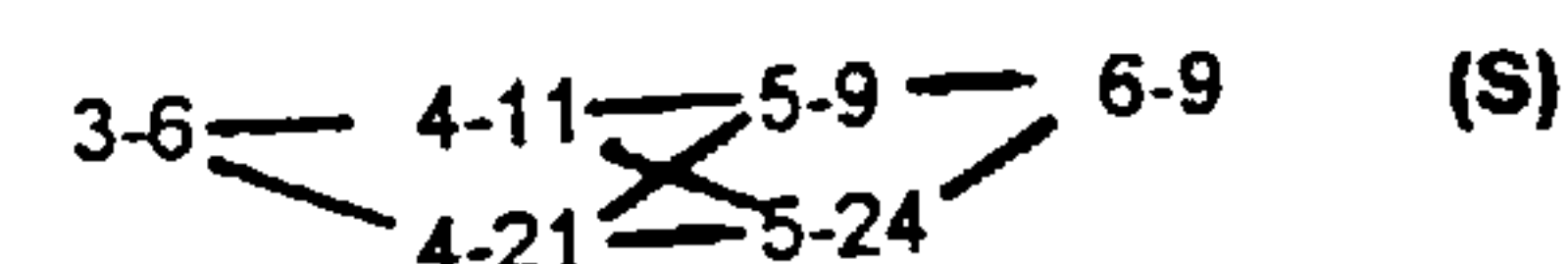
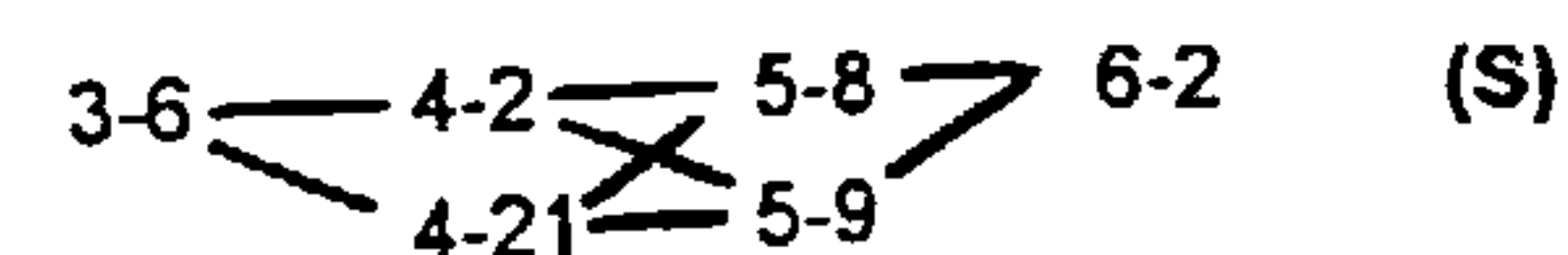
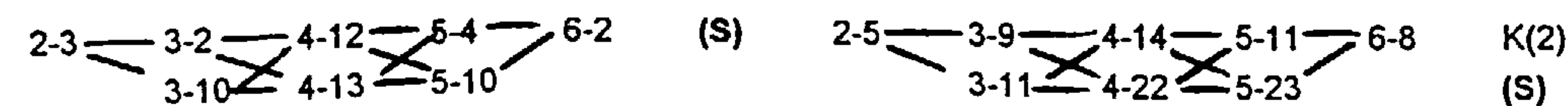
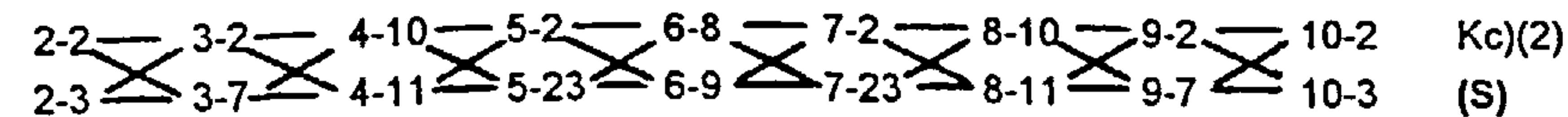
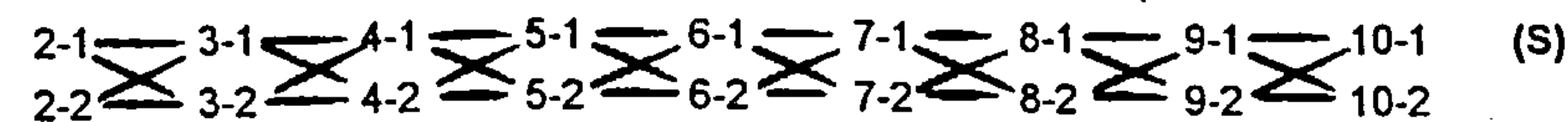
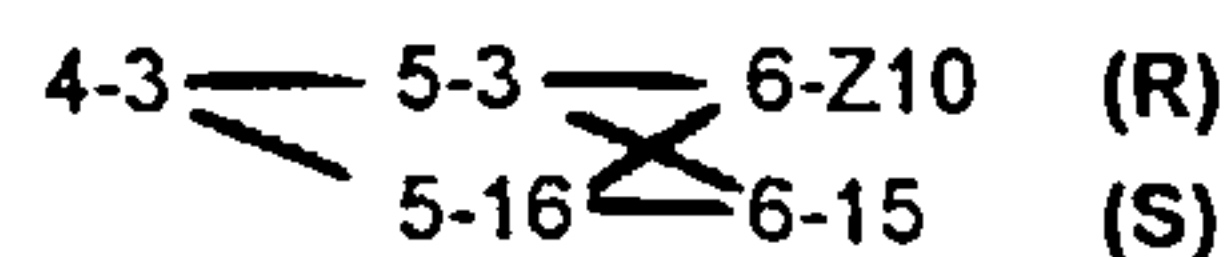
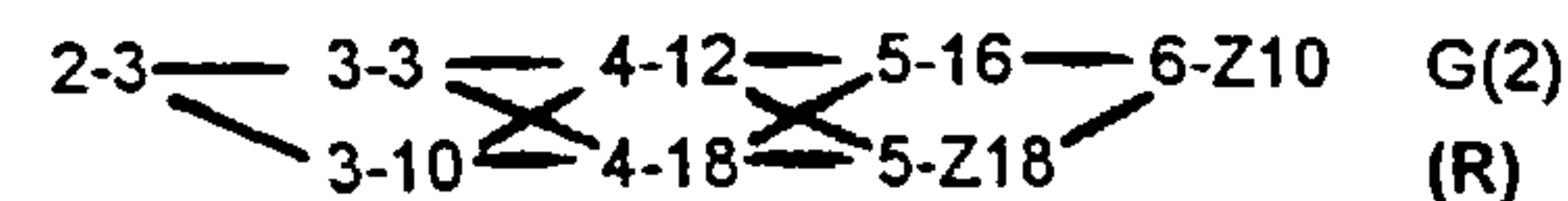
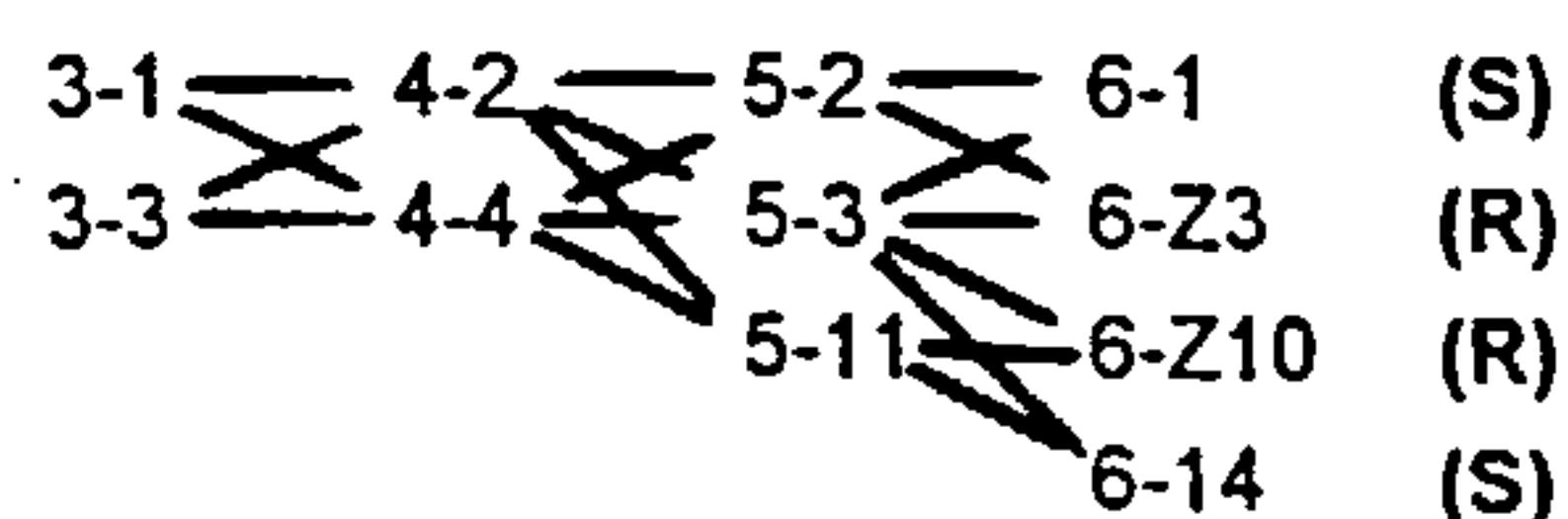
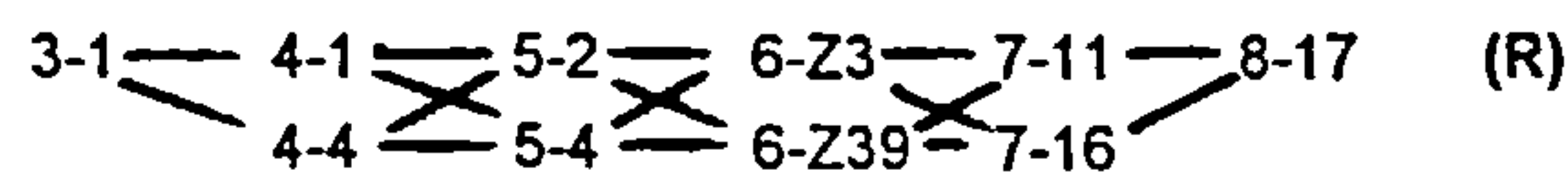
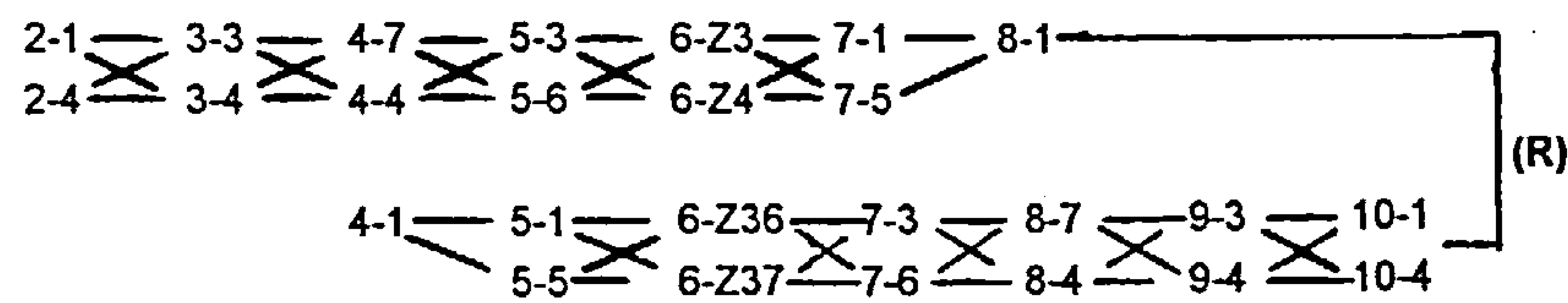
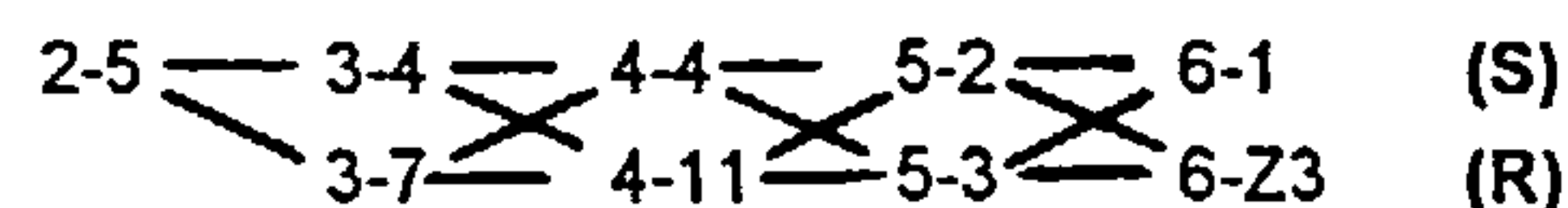
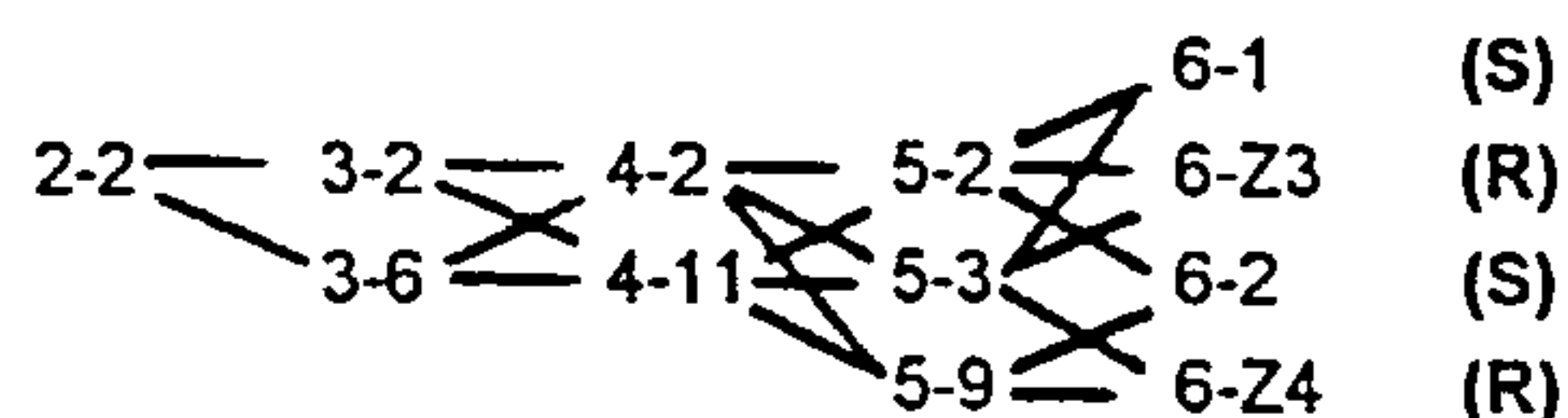
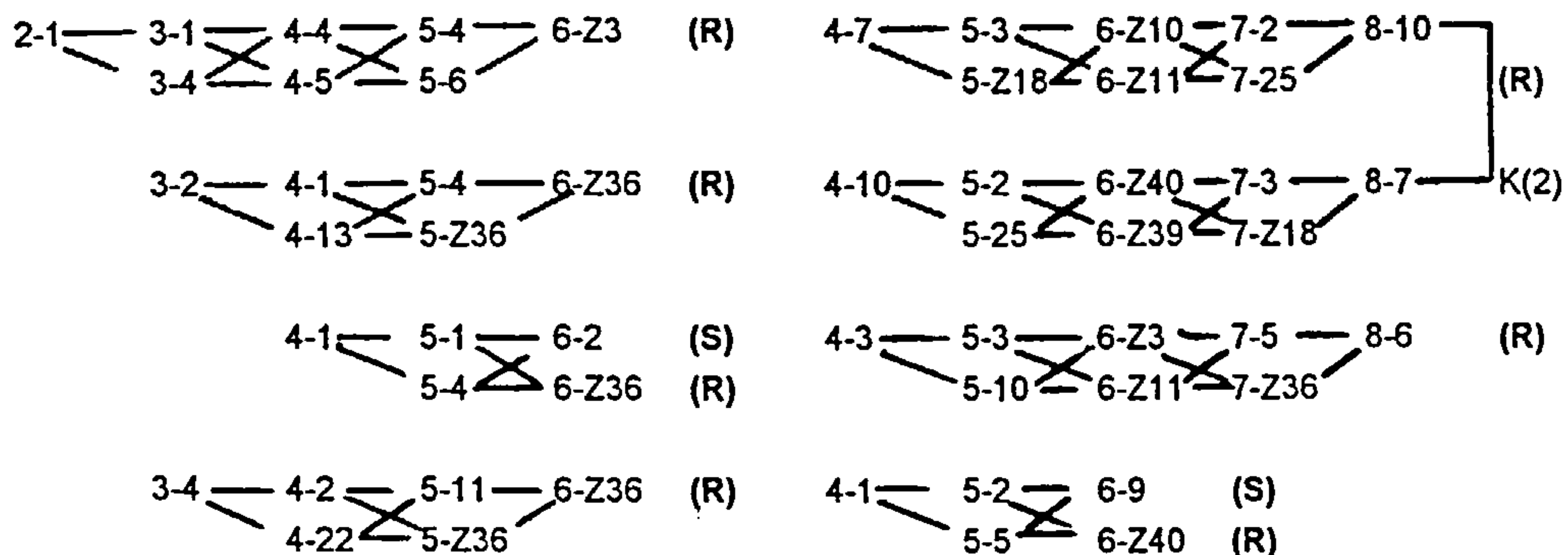


Table 6.4: Pitch-Class Set Genera

Hexatonic (6-20)

2-1	3-1	4-4	5-3	6-14
2-3	3-3	4-5	5-6	6-15
2-4	3-4	4-7	5-11	6-16
2-5	3-10	4-12	5-13	6-Z19
	3-11	4-14	5-16	6-20(X)
	3-12	4-17	5-Z17	6-31
		4-18	5-Z18	6-Z44
		4-19	5-20	
		4-20	5-21	
		4-24	5-22	
		4-27	5-26	
			5-27	
			5-30	
			5-32	
			5-Z37	
			5-Z38	

6-7

2-1	3-1	4-1	5-4	6-5
2-2	3-4	4-2	5-5	6-Z6
2-4	3-5	4-4	5-6	6-7
2-5	3-7	4-5	5-7	6-Z12
2-6	3-8	4-6	5-9	6-Z17
	3-9	4-8	5-13	6-18
		4-9	5-14	6-22
		4-Z15	5-15	6-Z38
		4-16	5-19	6-Z41
		4-22	5-20	6-Z43
		4-23	5-24	
		4-25	5-28	
			5-29	
			5-30	
			5-Z36	
			5-Z38	

Octatonic (6-30)

2-1	3-1	4-3	5-4	6-5
2-2	3-2	4-4	5-6	6-Z12
2-3	3-3	4-5	5-7	6-Z13
2-4	3-4	4-9	5-10	6-Z17
2-5	3-5	4-10	5-15	6-18
2-6	3-7	4-12	5-16	6-21
	3-8	4-13	5-Z18	6-Z23
	3-9	4-14	5-19	6-27
	3-10	4-Z15	5-25	6-Z28
	3-11	4-16	5-26	6-Z29
		4-17	5-28	6-30
		4-18	5-29	6-34
		4-25	5-31	6-Z41
		4-26	5-32	6-Z42
		4-27	5-Z36	6-Z43
		4-28(X)	5-Z38	6-Z45
		4-Z29		6-Z49
				6-Z50

Whole-tone (6-35)

2-2	3-6	4-2	5-8	6-21
2-4	3-8	4-11	5-9	6-22
2-6(X)	3-12	4-12	5-13	6-34
		4-16	5-24	6-35(X)
		4-19	5-26	
		4-21	5-28	
		4-22	5-30	
		4-24	5-33	
		4-25	5-34	
		4-27		

Diatonic (6-32)

2-1	3-2	4-2	5-2	6-8
2-2	3-4	4-8	5-9	6-9
2-3	3-5	4-10	5-11	6-14
2-4	3-6	4-11	5-Z12(X)	6-Z24
2-5	3-7	4-13	5-14	6-Z25
2-6	3-8	4-14	5-20	6-Z26
	3-9	4-Z15	5-23	6-31
	3-10	4-16	5-24	6-32
	3-11	4-18	5-25	6-33
		4-20	5-27	6-Z46
		4-21	5-29	6-Z47
		4-22	5-30	6-Z48
		4-23	5-32	
		4-26	5-34	
		4-27	5-35	
		4-Z29	5-Z36	
			5-Z38	

Chromatic (6-1)

2-1	3-1	4-1	5-1	6-1
2-2	3-2	4-2	5-2	6-2
2-3	3-3	4-3	5-3	6-Z3
2-4	3-4	4-4	5-4	6-Z4
2-5	3-6	4-7	5-5	6-8
	3-7	4-10	5-6	6-9
	3-9	4-11	5-8	6-Z10
	3-10	4-12	5-9	6-Z11
	3-11	4-13	5-10	6-14
		4-14	5-11	6-15
		4-18	5-16	6-Z36
		4-21	5-Z18	6-Z37
		4-22	5-23	6-Z39
			5-24	6-Z40
			5-25	
			5-Z36	

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*The Codification of Pitch Organisation
in the Early Atonal Works of Alban Berg*

Volume 2: Musical Examples

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Musical Examples

Musical Examples for Chapter 2: The fourth song, Opus 2

Example 2.1: Sum 7 wedges in Opus 2/4

a bars 11-14, piano

b bars 14-15, voice

Example 2.2: Octatonic and hexatonic scales

Octatonic, Coll 1

Coll 2

Coll 3

Hexatonic, Coll A

Coll B

Coll C

Coll D

Example 2.3: Octatonic and hexatonic zigzag formations

octatonic

4-3

4-17

4-17

4-17

hexatonic

4-7

4-20

4-20

Example 2.4: Octatonic segments in Opus 2/4

a

6-27 — Voice, bars 12-14 — 7-31

(Coll 1) 4-17 — 4-17 — 4-17

4-17 voice, bars 9-10 piano, bar 12

(Coll 1) (Coll 1) 4-17

b voice, bars 1-4

6-30 — 4-18

(Coll 3)

c voice, bars 3-4 voice, bars 21-22

Coll 1 Coll 2

d bar 12 bar 14 bar 17

4-25 4-25 4-25

5-28 — 5-28 — 4-25

Coll 2 Coll 3 Coll 3

e bars 10-11 (voice) voice, bar 3 voice, bars 21-22

Coll 2 4-18 — Coll 2 4-18 — Coll 2¹⁸

Example 2.5: Hexatonic segments in Opus 2/4

a

Coll C Coll D Coll A

b bars 9-10

Coll B Coll D

c voice, bars 5-6 bar 1

Coll C Coll D

d bar 5 bars 9-10 voice, bars 22-24

Coll A Coll A Coll A Coll B Coll C Coll C Coll C Coll C

Example 2.6: Associated groupings in bars 1-2, 11-12 and 20-22

Handwritten musical notation for Example 2.6, showing three bar groups: bars 1-2, bars 11-12, and bars 20-22. The notation includes treble and bass staves with notes, accidentals, and various handwritten annotations indicating groupings and intervals.

- bars 1-2:** Treble staff has notes with accidentals (sharps and flats). Bass staff has notes with accidentals. Annotations include "4-229", "5-20", and "8-215".
- bars 11-12:** Treble staff has notes with accidentals. Bass staff has notes with accidentals. Annotations include "7-20", "4-215", and "4-229".
- bars 20-22:** Treble staff has notes with accidentals. Bass staff has notes with accidentals. Annotations include "4-215b", "4-215", "4-229", "4-215/5-32", and "8ve".

Example 2.7: Progressions in Songs 2 and 4, Opus 2

Handwritten musical notation for Example 2.7, showing two bar groups: Song 2, bars 1-4, and Song 4, bars 20-22. The notation includes treble and bass staves with notes, accidentals, and various handwritten annotations indicating progressions and intervals.

- Song 2, bars 1-4:** Treble staff has notes with accidentals. Bass staff has notes with accidentals. Annotations include "8ve lower" and "Song 2, bars 1-4, all 4-25s".
- Song 4, bars 20-22:** Treble staff has notes with accidentals. Bass staff has notes with accidentals. Annotations include "8ve lower" and "Song 4, bars 20-22, alternate 4-229s/4-215s".

Musical Examples in Chapter 3: The String Quartet, Opus 3

Example 3.1: Principal themes/motives in Mvt. 1

al, bars 1-6

2nd vl. f -6

'head' motive

sfz

pp

pp

a2, bars 7-9

vl. p

pp

a3, bars 10-11

vl. p

b1, bars 43-47

vl. p

b2, bars 47-49

vlt.

p

cello

b2 'counter' theme

b3, bars 51-54

cello

p

b3 'counter' theme

b4, bars 58-62

viola

p

dim.

mf

f

ppp

Example 3.2: A catalogue of a_3 cells, Mvt. 1

The image displays five systems of handwritten musical notation, each consisting of a treble and bass staff. The notation includes various transformations labeled with letters and numbers, such as T-3, T-6, T-8, T-9, and Sum II. The systems are numbered 10, 15, 20, 25, and 30. The notation is complex, featuring many accidentals (sharps, flats, naturals) and ties. The transformations are indicated by arrows and labels, showing the relationship between different notes or groups of notes. The overall style is that of a working draft or a composer's sketch.

System 10: Treble staff starts with a treble clef and a key signature of one flat. Bass staff starts with a bass clef. Transformation T-8 is indicated between the two staves. Transformation Sum II is indicated above the treble staff.

System 15: Treble staff starts with a treble clef and a key signature of one flat. Bass staff starts with a bass clef. Transformation T-6 is indicated above the treble staff. Transformation T-8 is indicated between the two staves. Transformation Sum II is indicated below the bass staff. Transformation T-3 is indicated below the bass staff.

System 20: Treble staff starts with a treble clef and a key signature of one flat. Bass staff starts with a bass clef. Transformation I-1 is indicated above the treble staff. Transformation T-9 is indicated between the two staves. Transformation T-8 is indicated below the bass staff.

System 25: Treble staff starts with a treble clef and a key signature of one flat. Bass staff starts with a bass clef. Transformation T-3 is indicated above the treble staff. Transformation T-6 is indicated below the bass staff.

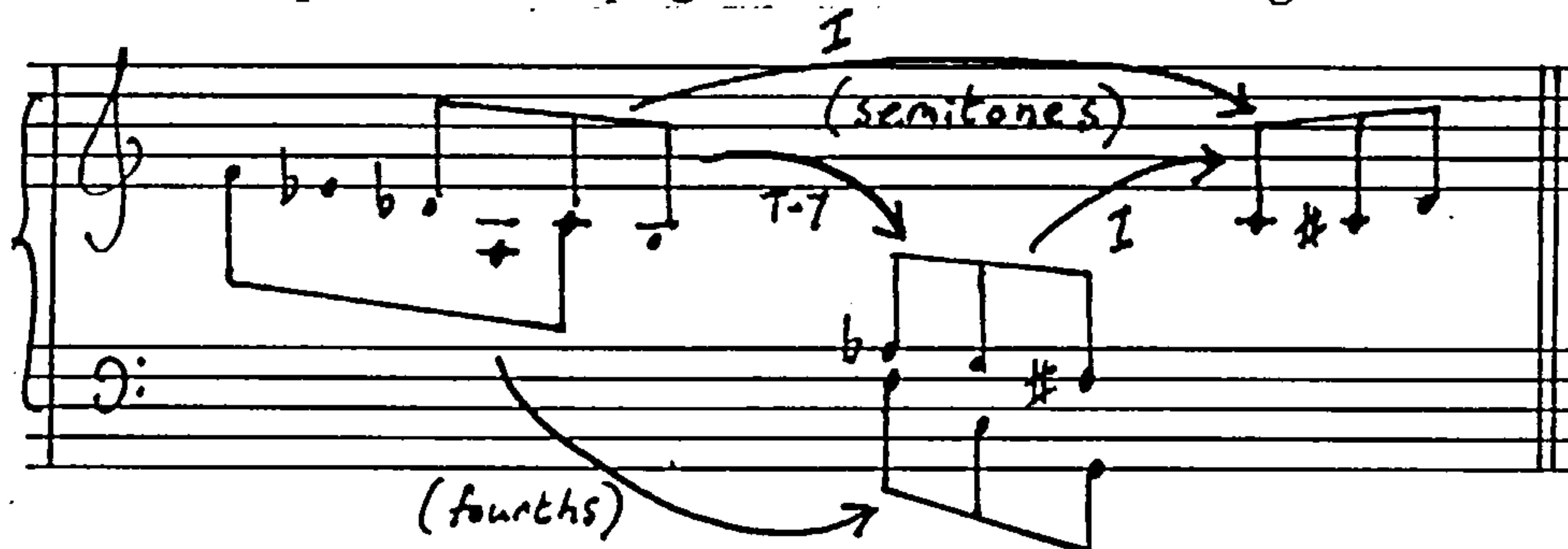
System 30: Treble staff starts with a treble clef and a key signature of one flat. Bass staff starts with a bass clef. Transformation T-3 is indicated above the treble staff. Transformation T-8 is indicated above the treble staff. Transformation T-9 is indicated below the bass staff.



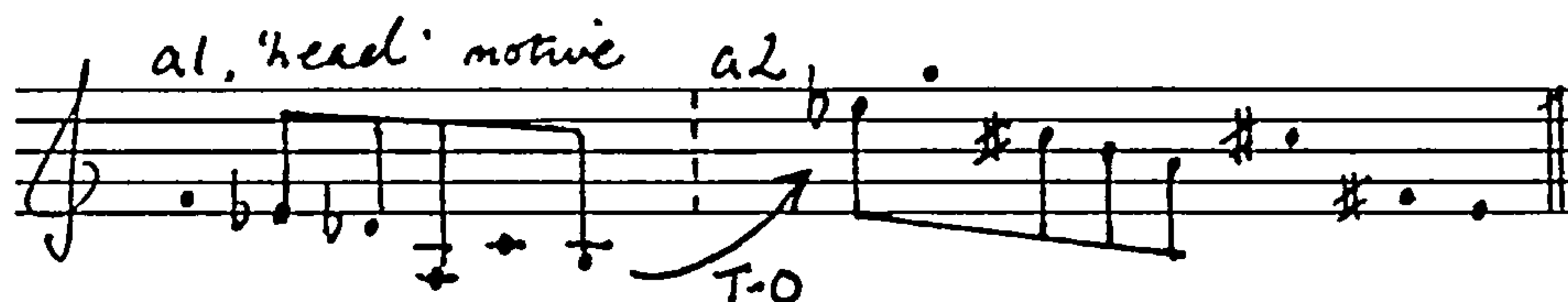
Example 3.3: The a3 'extended' motive in Mvt. 1



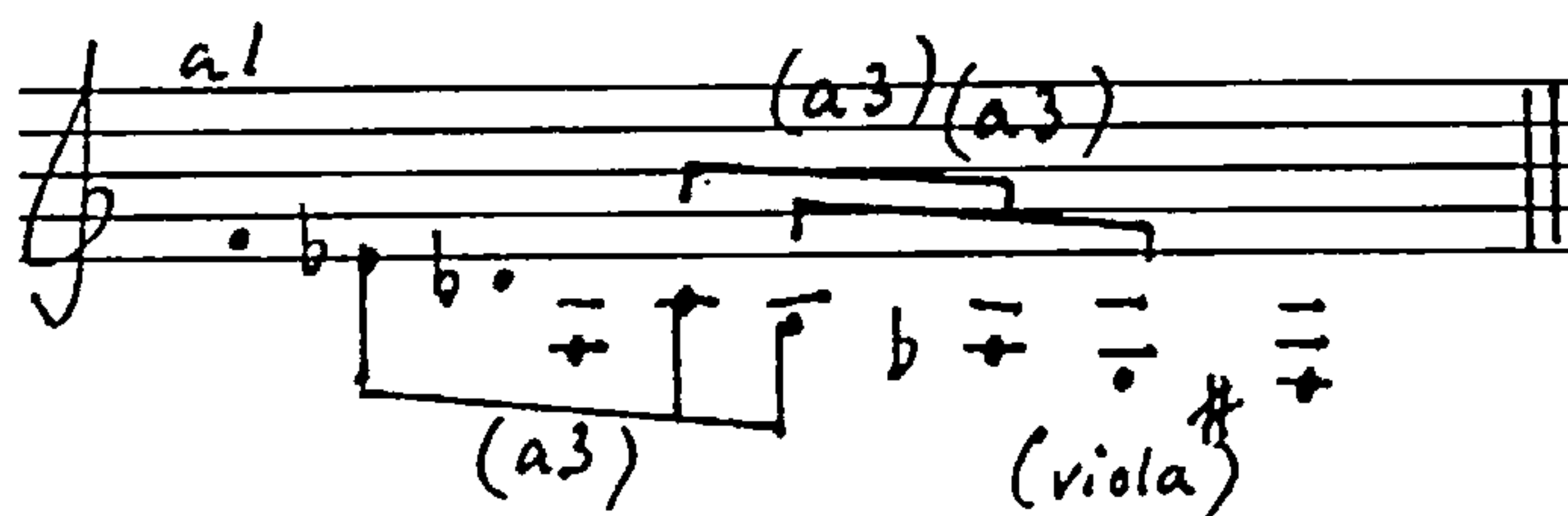
Example 3.4: developing variation within the *Grundgestalt*



Example 3.5a: a2 within a1, Mvt.1



Example 3.5b: a3 within a1, Mvt. 1



Example 3.5c: The a3 'extended' motive in a1, Mvt. 1

a1, bb 1-3

a1, bb 4-6

a3 'extended' motive

T-7

T-4

Example 3.5d: a3 within the second subject, Mvt. 1

vcl, bars 52-53

cello, bars 71-73

T-4

Example 3.5e: b1's relationship to a1 and a3, Mvt. 1

'head' motive (a1) b1, bars 43-44

a3, bars 10-11

R-2

Same rhythm

Example 3.5f: b3's 'anticipation' related to a1, Mvt. 1

'head' motive (a1) b3, bar 45

T-10

Example 3.5g: The 4-note whole-tone scale in b1, b3 and b4, Mvt. 1

'head' motive (a1) b2, bars 48-49

b3, bars 52-24

b4, bars 58-60

T-5

T-0

T-9/11

Example 3.6: Themes and motives, Mvt. 2

Handwritten musical score for a piece in 3/4 time. The score is written on three staves. The first staff begins with a treble clef and a 3/4 time signature. It features a *ritornello* section with a key signature of one flat (B-flat) and a tempo marking of *f* *sehr heftig*. The second staff continues the *ritornello* and introduces a *stentato figure* marked *ff*. The third staff begins with a bass clef and a 3/4 time signature, featuring a *marcato theme* marked *fff*. The score includes various musical notations such as notes, rests, accidentals, and dynamic markings.

anticipatory variant, bars 2-3

[illegible]

Lyrical theme, bars 10-13

Handwritten musical notation for the first staff of 'The Rose Tree'. The key signature is one sharp (F#). The melody begins with a quarter note on G4, followed by a quarter note on A4, and then a quarter note on B4. A slur covers the next three notes: a quarter note on A4, a quarter note on G4, and a quarter note on F#4. The tempo marking 'Andante' is written above the staff. The dynamic marking 'fp' (fortissimo) is written below the staff. The notation continues with a quarter note on E4, a quarter note on D4, and a quarter note on C4. A slur covers the next three notes: a quarter note on B3, a quarter note on A3, and a quarter note on G3. The tempo marking 'Andante' is written above the staff. The dynamic marking 'molto' (molto) is written below the staff.

diatonic scale figure. ^{bars 13-15}

[illegible]

Handwritten musical notation for a sextuplet motive in bars 25-26. The notation is on a single staff with a treble clef. It features a series of six notes (F#, G, A, B, C, D) grouped by a bracket and a '6' above it, indicating a sextuplet. The notes are written in a shorthand style with stems and flags. A dynamic marking 'p' (piano) is written below the first note. The notation is followed by a bar line and a final note (D) with a downward-pointing arrow below it.

'signature harmonies, bar 34

grazioso variant, bars 39-40

fourths - plus semitones figure, bars 37-38

second theme, bars 53-54

Example 3.7: *Stretto* entries of the lyrical theme, Mvt. 2

Example 3.8: The 'head' motive and *al* from Mvt. 1, in Mvt. 2

bars 168 - 171

bars 227 - 230

Example 3.9: Contoural resemblances in Mvt. 2

ritornello

anticipatory variant

marcato theme

lyrical theme

sextuplet motive

grazioso variant

Example 3.10a: The ics 1,1 cell and extensions, Mvt. 2

Example 3.10b: The major seventh and ics 4,7 cells, Mvt. 2

Example 3.10c: The major third and ics 2,2 cells, Mvt. 2

Example 3.10d: The falling tritone cell, Mvt. 2

Example 3.11: Thematic/motivic associations, Mvt. 2

a + b marcato theme

anticipatory variant #

b + b marcato theme

lyrical theme (T-II)

c + b marcato theme

diatonic scale figure
8ve -----
(R)

d + b ritornello (8ve lower)

sextuplet motive (8ve lower)

Example 3.12: Relationships between movements

Handwritten musical sketches and annotations:

- a** Mvt. 1, a1, vla $b \rightarrow \#$ $\text{ave} \dots$
Mvt. 2, ritornello $b \rightarrow \#$ marcato theme
- b** Mvt. 1, a3 $b \rightarrow \#$ wedge, bars 1-2
Mvt. 2, ritornello
- c** Mvt. 1, a1 double dotted figure, bars 3-6 marcato theme
Mvt. 2, ritornello dotted rhythm $\text{diatonic scale figure}$
 $\text{sextuplet motive (8ve)}$
(all dotted rhythms)
- d** Mvt. 1, a2 $\text{anticipatory variant}$
Mvt. 2, marcato theme
- e** Mvt. 1, a1 ritornello
Mvt. 2, sextuplet motive (8ve) $(T-0)$
 $\text{anticipatory variant, bar 3}$ $(T-6)$
 viola, bars 1-2 $(T-6)$
(initial note, 2nd, 3rd - 4th phrases)

f Mvt. 1, 'head' motive

Mvt. 2, sextuplet motive (8ve)

Mvt. 1, a3, bars 10-11

Mvt. 2, 'signature' harmonies, bars 36-38

Mvt. 1, b2

Mvt. 2, viola, bars 133-134

cello, bars 16-18

VL 2, bar 57

VL 1, bars 56-57

(T-7)

(T-7)

(T-6)

(T-0)

Example 3.13a: Canonic a3, Bars 14-18, Mvt. 1

vla.

etc.

vl. 2

etc.

etc.

etc.

cello

(bar 16)

vl. 1

cello, vla. b. q. etc.

Example 3.13b: Canonic *a2*, bars 113-114, Mvt. 1

Example 3.13c: *a5* 'stretti', bars 123-125, Mvt. 1

Example 3.13d: Canonic elements, bars 126-131, Mvt. 1

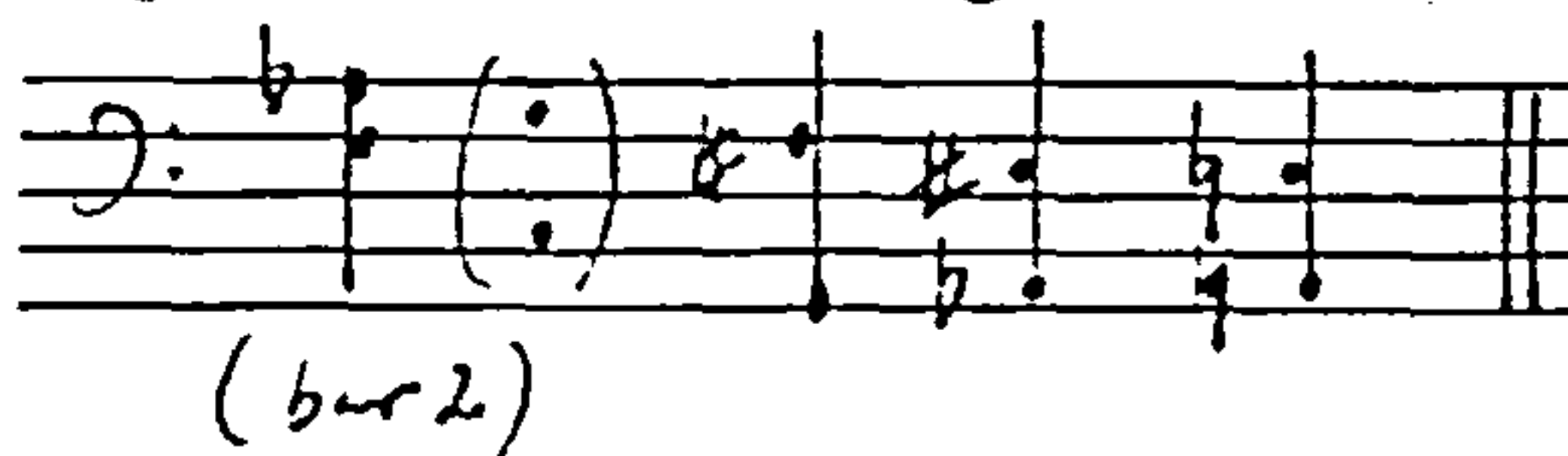
Example 3.14: Recurrence of elements from the bar 9 sonority, Mvt. 1

Example 3.15: Contrasting whole-tone areas, bars 5-9, Mvt. 1

Example 3.16: Interval cycles in bars 1-2 (a/), Mvt. 1

Example 3.17: Sums 11/0 wedge, bars 3-6, Mvt. 1

Example 3.18: Sum 1 wedge, bars 3-4, Mvt. 1



Example 3.19: Some other symmetries, Mvt. 1

Sum 10 PI dyads (b6) bb 1-2 b6 b7 b8 b9 b13 bb 14-15

b a3 b33 b34 b36 bb 37-38 b39 b40 b43 b47

Sum 2 PI dyads a3 b a3 # a3 Sum 3 a3

bars 14-16 bars 22-23 bar 25 bar 17

Sum 8 a3 Sum 0 # b # b bars 20-21 bars 24-25 bar 60

a3

Example 3.20: Contrasting whole-tone scales, bars 29-31, Mvt. 1

Violin I

Cello

The Violin I part features two whole-tone scales: an ascending scale from C4 to C5 (C, D, E, F, G, A, B, C) and a descending scale from C5 to C4 (C, B, A, G, F, E, D, C). The Cello part features a whole-tone scale from C3 to C4 (C, D, E, F, G, A, B, C) and a descending scale from C4 to C3 (C, B, A, G, F, E, D, C).

Example 3.21: Interval cycles in vl. 2, viola and cello, bars 98-101, Mvt. 1

dim. triads descending in fourths

major triads ascending in fourths

descending in fourths

dim. triads (interval -3) descending in semitones

fourths (interval -5) descending in semitones

descending in fourths

descending in fourths

aug. triads (interval -4) descending in semitones

pc set 3-5s (0,1,6) descending in semitones

The score shows three staves: Violin 2, Viola, and Cello. Each staff contains a series of chords connected by lines, representing interval cycles. The annotations describe the intervals and the way the cycles are constructed (e.g., descending in fourths, ascending in fourths, descending in semitones).

Example 3.22: Alternating-interval cycles, Mvt 2

a Fifths/tritones, bars 5-10, Mvt. 2

(+) b (descending) Semitones

(ascending) Semitones

(Marcato theme)

Ab D Ab

The score shows a single staff with a series of chords connected by lines, representing alternating-interval cycles. The annotations describe the intervals and the way the cycles are constructed (e.g., descending in fourths, ascending in fourths, descending in semitones).

b semitones / tritones, bars 72-87, Mvt. 2

bar 111, bars 159-165 bar 217

c major 3rds / minor 3rds, bar 78, Mvt. 2

d fourths / semitones, bars 148-151, Mvt. 2

Sum 4 about D Sum 2 about G

Example 3.23: Interval cycles, Mvt 2

a: Fourths, bar 12

b: Rising fourths and descending semitones in whole-tone blocks, bars 13-15

3-8 (v7) 3-8 (v7) 3-8 (v7) 3-8 (v7)

c: Semitonal and whole-tone descent, bars 12-19

whole-tone, bars 16-18 semitonal, bars 12-19

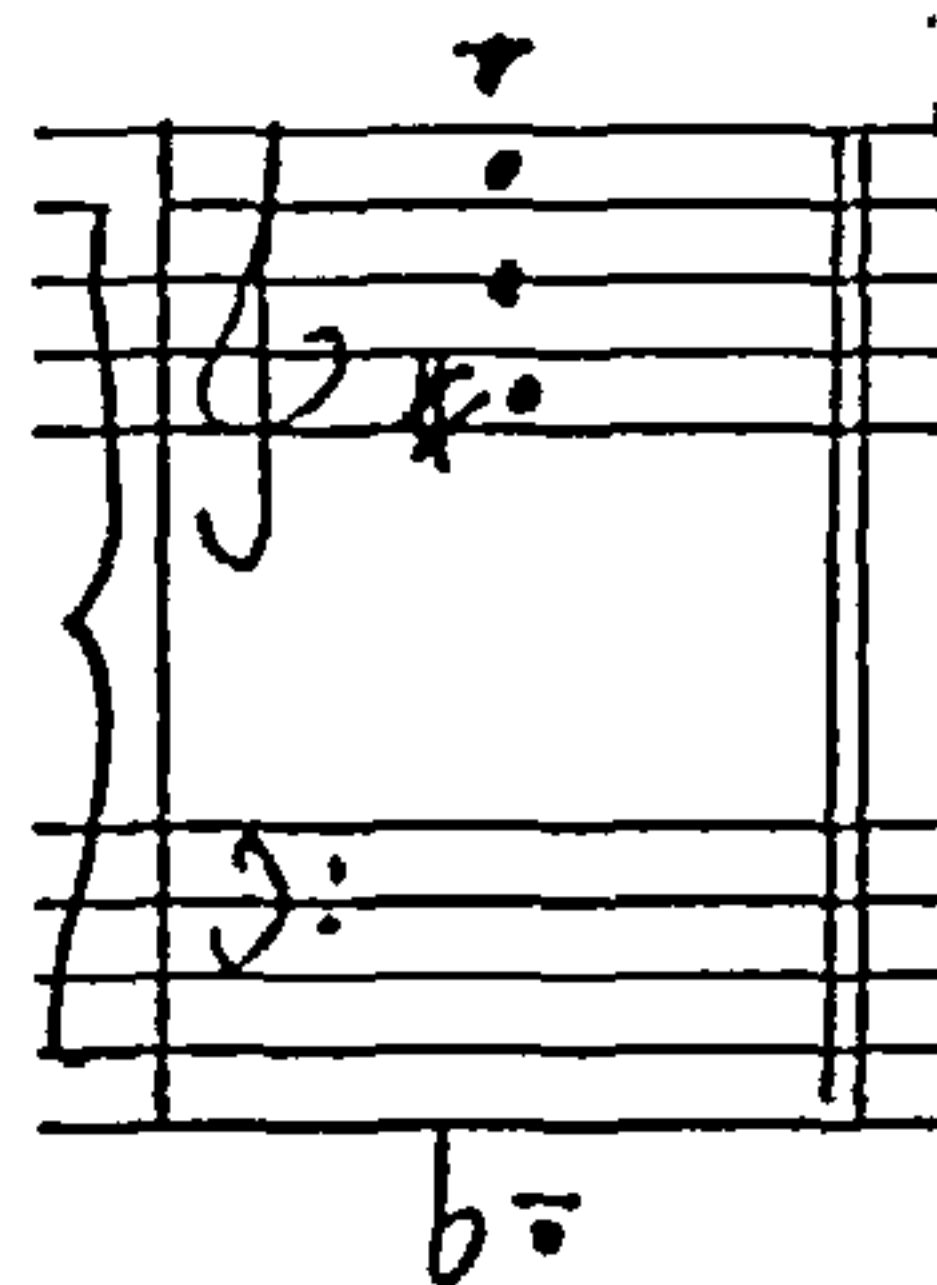
d: Fifths cycles a tritone apart, bars 24-28



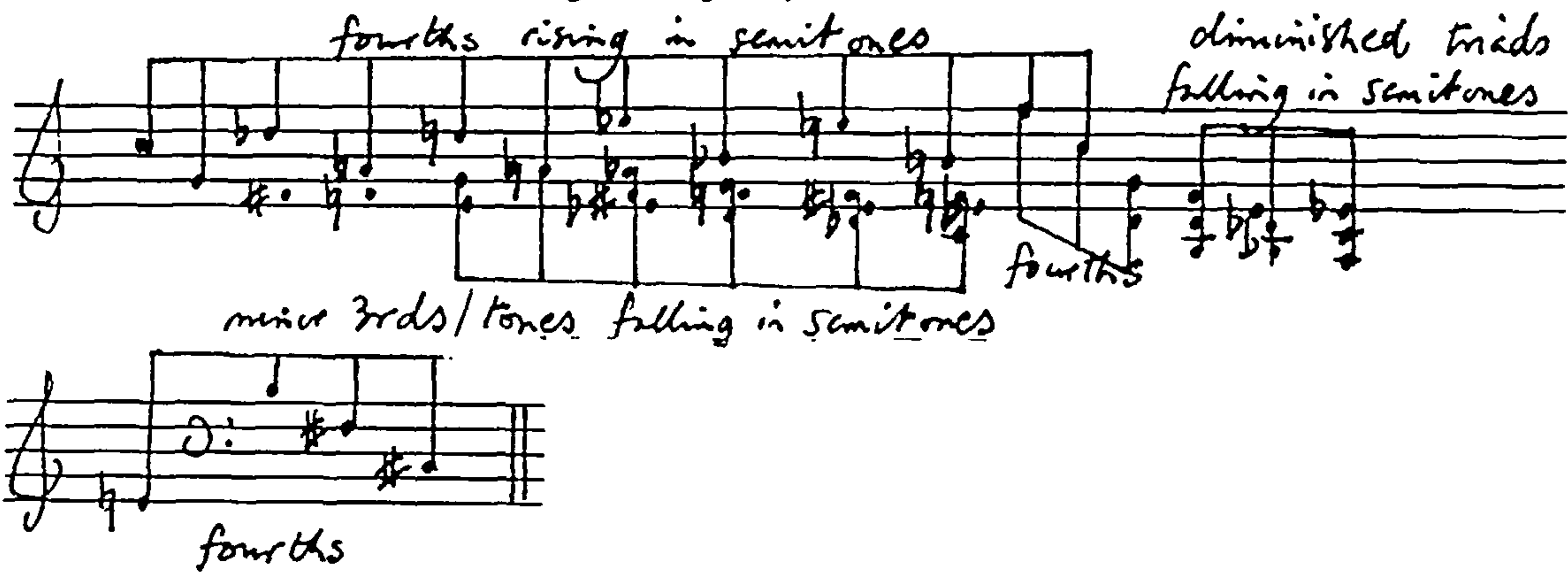
e: Augmented triads, bars 34-38



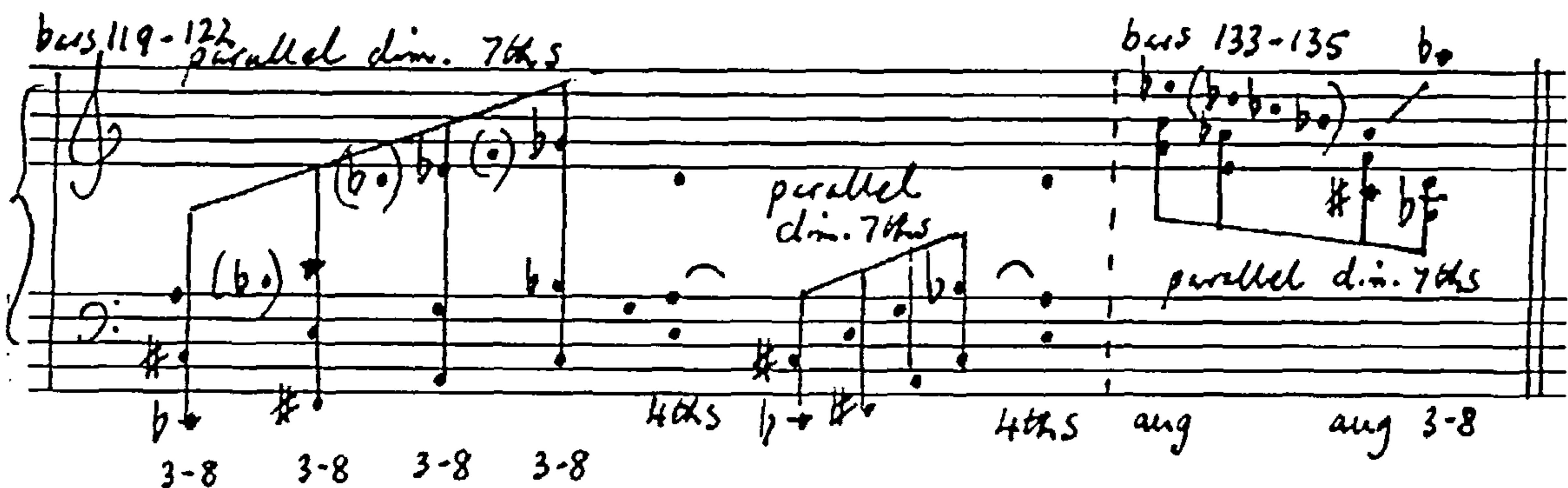
f: Fourths chord, bar 49



g: Multiple cycles, bars 114-117



h: Diminished seventh tetrachords, bars 119-122



i: Multiple cycles, bars 151-153

Semitones

Semitones

aug. triad.

5ths

4ths, Symmetrical & Semib, about A

j: Multiple cycles, bars 169-170

dim. 7th

Semitones / fourths

k: Descending fourths, bars 187-188

Descending fourths

/: Multiple cycles, bars 230-232

Handwritten musical score for four staves (treble and bass clefs). The notation includes various intervals and chords, with handwritten annotations: "aug. triads" (top staff), "fourths" (second and third staves), "fourths" (third staff), "alternating fifths / major thirds" (bottom staff), "dim. 7th" (bottom staff), and "(D minor chord)" (bottom staff).

Example 3.24: Inversional symmetries in Mvt. 2

a: Cello, bars 29-32

Handwritten musical score for Cello, bars 29-32. The notation shows a melodic line with various intervals and chords, with handwritten annotations: "Sum 8" (bottom staff) and "Sum 2" (bottom staff).

b: Cello, bar 40

Handwritten musical score for Cello, bar 40. The notation shows a melodic line with various intervals and chords, with handwritten annotations: "Sum 8" (bottom staff).

c: Cello, bar 57

Sum 2, octatonic

Sum 4

Sum 4

octatonic

octatonic

1 2 3 4 5 6

1 2 3 4 5 6

6 1 5 4 2 3

3 2 4 5 1 6

d: Bar 232

Sum 7

vl 2

vl 1

vla.

cello

vla/cello (progression is in 'signature' harmonies)

e: Bar 232

1st quarter

viola

vl 2

b.

TJ2

Sum 2 (about B/C)

f: Bar 232

(D minor chord)

Cello

viola

violin 2

violin 1

cello

Sum 8 (about B \flat & E)

Example 3.25: Wedge formations about D and G, Mvt. 2

a Bars 3-4, Mvt. 2

Sum 4 (D)

vl 1/vla

b Bars 33-34

Sum 2 (G)

vla/cello

c Bars 62-64, Mvt. 2

Sum 6 (Eb)

Sum 4 (D)

Sum 6 (Eb)

d Bars 66-72, Mvt. 2

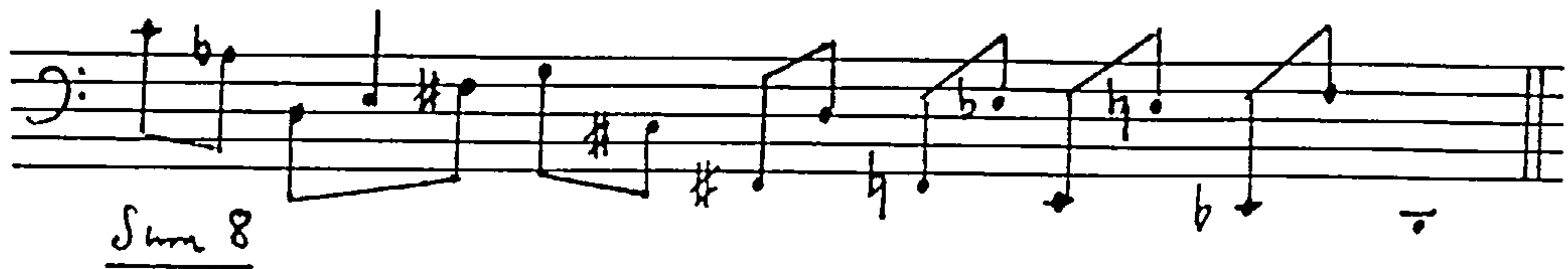
e Bars 150-151, vcl 1 vla/vls Mvt. 2

f Bars 216-217, Mvt. 2

Example 3.26: Wedge formations about E and Bb, Mvt. 2

a Bars 1-3, Mvt. 2

b Bars 5-8 (marcato theme), Mvt. 2



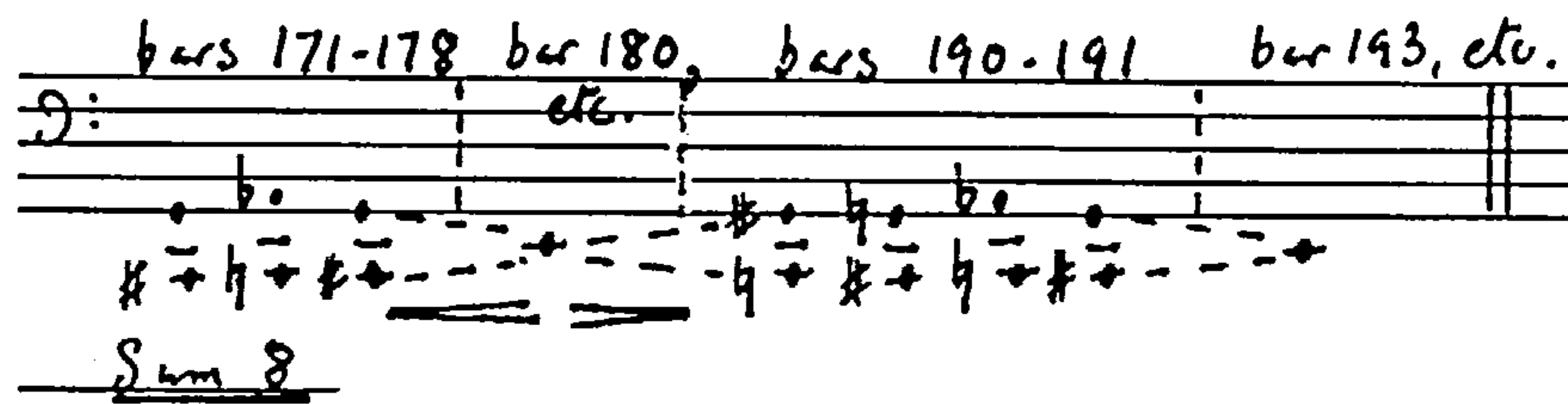
Sum 8

c Bars 40, 42 and 44-45, Mvt. 2



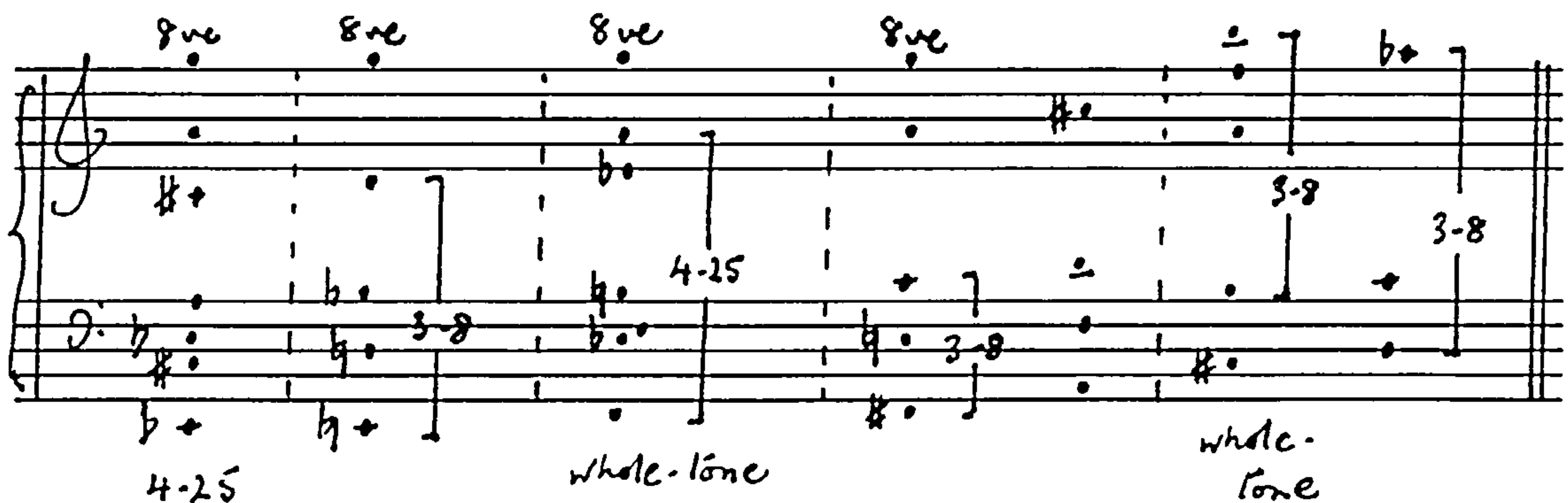
Sum 8

d Bars 171-178 and 190-191

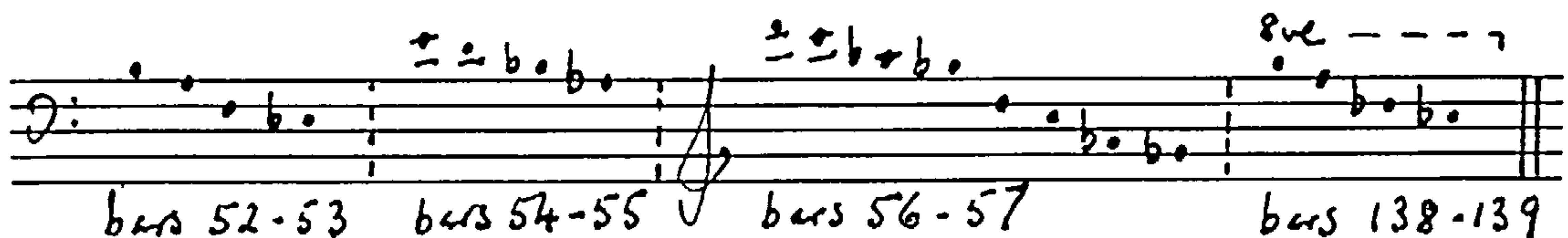


Sum 8

Example 3.27: French sixths (4-25) in bars 90-94, Mvt. 1



Example 3.28a: Melodic 4-25s in b3, Mvt. 1



Example 3.28b: 4-25s as chords, bars 127-130, Mvt. 1

bar 127 bar 129 bar 130

Example 3.28c: Descending 4-25s. bars 172-183 Mvt. 1

bars 172-173 (3-8) bars 182-183

Example 3.29: Twelve-note aggregate, bars 45-47, Mvt. 1

cello

Example 3.30: Hexatonic grouping in bars 31-33, Mvt. 1

vl 1 vl 2 vl 1 vl 2 vla

Example 3.31a: Brief tonal centres, Mvt. 1

Handwritten musical score for "The Rose Tree" in G minor. The score is divided into two systems. The first system contains measures 9, 32, and 175-176. The second system contains measure 182. The key signature is G minor (one sharp, two flats). The notation includes treble and bass staves with notes, rests, and bar lines. The tempo is marked "Allegretto" and the time signature is "3/4". The score is labeled "The Rose Tree" and "Op. 10 No. 1".

Example 3.31b: Preparation for G minor, bars 28-31, Mvt. 1

Handwritten musical score for guitar, showing three systems of music. The first system has three measures with chords Bbm, Fm, and C#m. The second system has three measures with chords Bm, Gm, and Dm. The third system has one measure with a V7 chord in G minor. The page is numbered 30.

Handwritten musical notation for the first staff of the song. The staff is a single five-line staff with a treble clef. The melody is written in a simple, folk-like style. The notes are: G4 (quarter), A4 (quarter), B4 (quarter), C5 (quarter), B4 (quarter), A4 (quarter), G4 (quarter), F#4 (quarter), E4 (quarter), D4 (quarter), C4 (half). The key signature has one sharp (F#). The time signature is 4/4. The staff ends with a double bar line.

bars 23-28 vl1 8ve - - - vl2

marcato theme, bar 29

almost all rising to the same w.t. group members

b 154 b 155 b 156 b 158 b 159

b 160 b 161 b 162 b 164

a Birds 1-2, Mt. 2

[illegible]

b Bars 34-39, Mvt. 2

'Signature' harmonies

c Bars 64-65, mvt. 2

d Bars 154-162, Mvt. 2

e Bars 164-169, Mvt. 2

bb. 164-167 bb 168-169

f Bars 177-186, Mvt. 2

'Signature' harmonies, bars 177-178

Mascati theme, bar 181

anticipatory variant, bar 185

Example 3.35: Goal-directed whole-tone scales, Mvt. 2

Bars 10-22

vll1 vll1 vll2 vll1

(D#) (D#)

Bars 129-141

cello vlla vll2 vll1

Bars 212-216

cello vlla vll2 vll1

Example 3.36: The *a3* cell within *a1*'s 'head' motive, bars 122-125, Mvt. 1

Example 3.37: The 'reconstruction' of the 'head' motive, bars 175-176 and 182-185, Mvt. 1

Example 3.38: The transition from Exposition to Development, bars 76-85, Mvt. 1

bars 82-83 bars 85-86

Handwritten musical score for bars 82-83 and 85-86. The score is for a string quartet (Violin 1, Violin 2, Viola, Cello). It shows ascending and descending whole-tone scales. Annotations include 'vl 1', 'vl 2', 'b4', 'chromatic', and 'vla cello'.

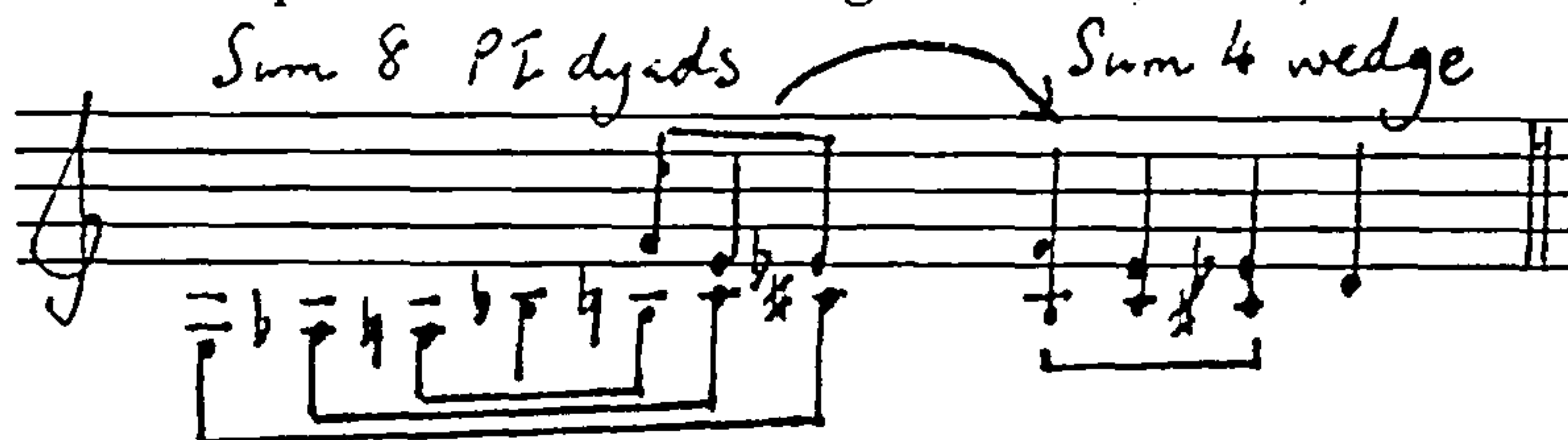
Example 3.39: Ascending and descending whole-tone scales in bars 81-87, Mvt. 1

Handwritten musical score for Example 3.39, bars 81-87. The score is for a string quartet. It shows ascending and descending whole-tone scales. Annotations include 'vl 1 bb 81-82', 'vla bb 83', 'vl 2 bb 84-86', 'vl 1 bb 85-87', 'vla bb 86-87', 'vla bb 83-84', 'cello bb 84-85', and 'cello bb 86-87'.

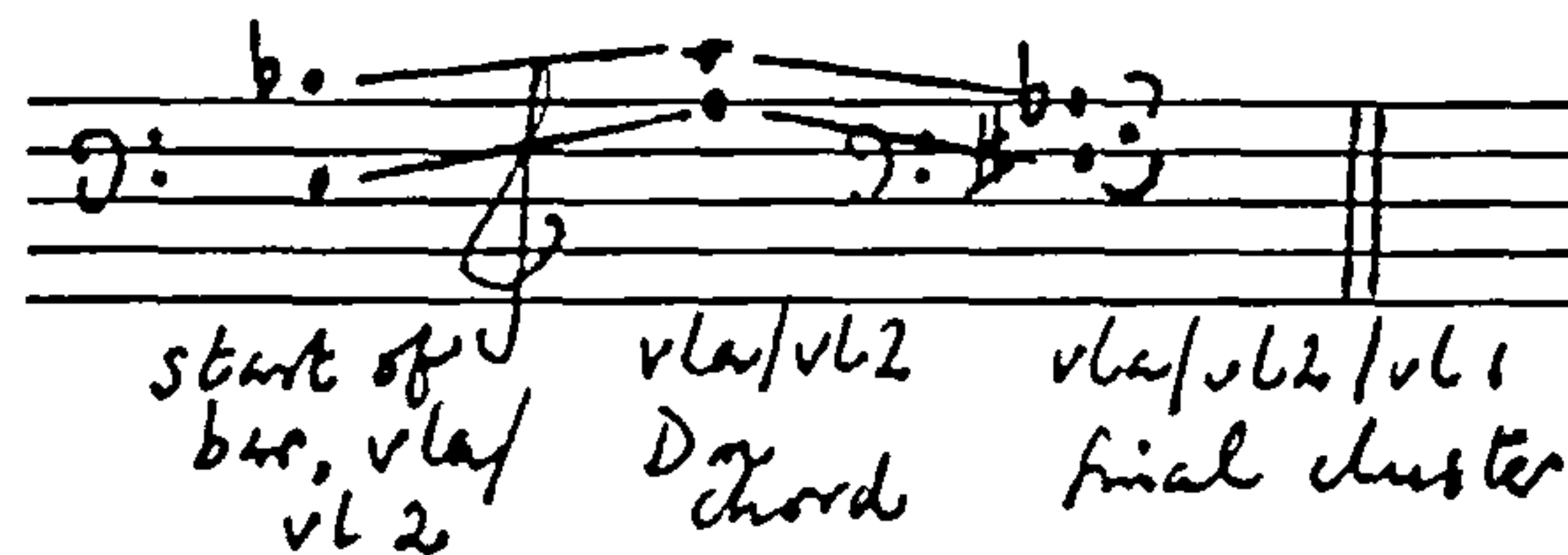
Example 3.40: *Grazioso* and anticipatory variants, Mvt. 2

Handwritten musical score for Example 3.40, bars 39, 43, 144-145, 147, 148, 194-195, 198, and 199-200. The score is for a string quartet. It shows 'grazioso' and 'anticipatory' variants. Annotations include 'grazioso, bar 39', 'anticipatory, bar 43', 'grazioso, bars 144-145', 'anticipatory, bar 147', 'anticipatory, bar 148', 'anticipatory, bars 194-195', and 'anticipatory, bars 199-200'.

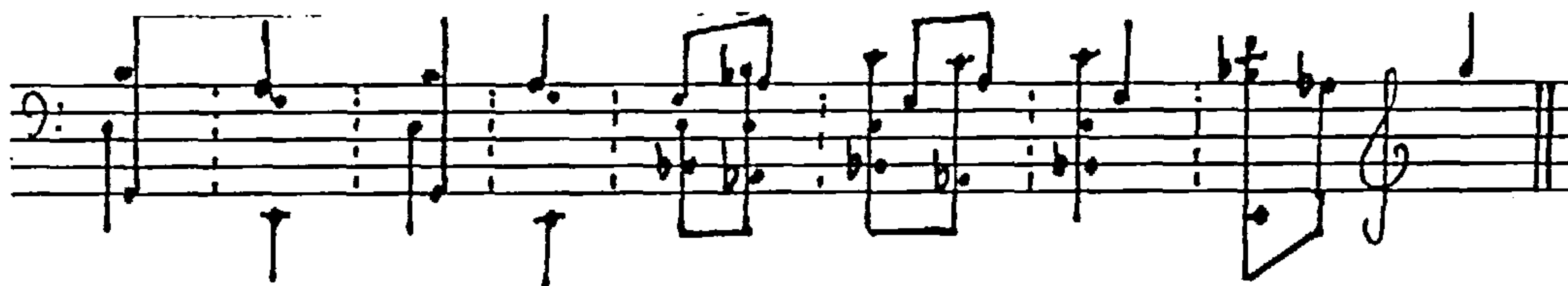
Example 3.41: Sum 8 ceding to Sum 4, bar 3, Mvt. 2



Example 3.42: Sum 2 'wedge', bar 232, Mvt. 2



Example 3.43: 'Wrong-note' whole-tone harmony, bars 179-186, Mvt. 2



Musical Examples for Chapter 4: The *Altenberglieder*, Opus 4

Example 4.1: Principal motives

α Songs 2 and 5 $b, b = +$ Song 1, bar 9

β

γ

δ Song 5 Song 1, bars 9-15

ε Song 3, bars 9-11 Song 5, bars 11-12

I/VI

II, trumpet

III, flutes, violins *8ve* $b \div$

IV, celesta

V, piano

Song 1, bar 1 etc.

VII . b + b = Song 1, bar 35 (initially bars 24-25, in inversion)

piccolo

VIII, trombones Song 1, bars 33-34 (inversion of VII in bars 25-32)

IX b + ., violins Song 1, bars 34-35 (initially bars 25-26)

X Song 1, bars 24-34

Example 4.2: Variants of Motive ϵ

Song 1, voice, bars 22-23

Song 3, oboe, bars 9-11 ma. 6th

Song 5, oboe, bars 11-12

Song 2, voice + celesta, bars 8-9 mi. 6th

Song 2, voice, bars 8-9

Song 4, cor anglais, bars 6-8

Song 4, voice, bars 4-5 and 9-10

T-0

T-2

T-6

Example 4.3: Motives and their pc sets

α

β

4-8

3-9

4-16

5-7

4-16

4-23

5-7

6-7

4-13

4-27

5-31

Song 1, bar 15, part of descending 7 figure

(II)

I

III

IV

V

(II) VII

IX

Example 4.4: The relationship of ζ , β , α and ε to δ

The image shows a handwritten musical score with five staves, each containing a series of notes. The staves are labeled with Greek letters: δ , ζ , β , α , and ε . The notes are connected by various lines and arrows, indicating relationships between them. Annotations include:

- β reversed (with F, as in voice, bars 25-32)
- α reversed
- (T-5)
- 5-7s

The score is written on five staves, each with a treble clef. The notes are connected by various lines and arrows, indicating relationships between them. The staves are labeled with Greek letters: δ , ζ , β , α , and ε . The notes are connected by various lines and arrows, indicating relationships between them. The staves are labeled with Greek letters: δ , ζ , β , α , and ε .

Example 4.5: Invariant cell links between songs

Example 4.6: The first phrase of Song 2, related to δ

Song 2, bars 1-2

Sat T-7

Example 4.7: Pc set 5-7s in Song 2

Handwritten musical notation for Example 4.7. The top staff is labeled "(Cl.) cello, bars 6-7" and shows a melodic line with intervals of 5-7 and 7-7. The middle staff is labeled "voice, bars 8-9" and shows a melodic line with intervals of 5-7. The bottom staff is labeled "celesta, bars 8-9" and shows a melodic line with intervals of 5-7 and 7-7.

Example 4.8: The genesis of cells 3-3 and 4-17 in Song 2, bars 1-5

Handwritten musical notation for Example 4.8. The notation includes staves for voice, violas, Cl./Hp., cello, Basses, Horn, and Violas. Brackets indicate intervals of 3-3 and 4-17. The notation shows the genesis of cells 3-3 and 4-17 in Song 2, bars 1-5.

Example 4.9: Falling 6ths in Song 3, bars 7-12

Handwritten musical notation for Example 4.9. The notation includes staves for voice, clarinet, fl/hns., oboe, ob/vlas., and cello/basses. Brackets indicate intervals of 6ths. The notation shows falling 6ths in Song 3, bars 7-12.

Example 4.10: Imitative association of voice and cor anglais in Song 4, bars 4-10

Handwritten musical notation for Example 4.10. The notation includes staves for Voice, bars 4-5 and bars 9-10, and Cor anglais, bars 6-9. The notation shows imitative association of voice and cor anglais in Song 4, bars 4-10.

Example 4.11: Sequential imitation in Song 4, bars 23-29

voice/oboe, bb. 23-24 oboe, b. 23 ob./cl. bb. 24-25

cl./fl. bb. 25-26 fl. b. 27

cl./fl. bb. 26-27 cl./voice bb. 26-29

celeste/fl. bb. 27-29

8ve-- 8ve--

Example 4.12a: Whole-tone alternation in Song 1, bars 22-24

winds voice

strings (+ brass)

clarinets

Example 4.12b: Whole-tone alternation in Song 3, bars 9-11

voice C.A.

oboe

fl./has.

cl.

has.

vlas.

trumpet

Example 4.12c: Whole-tone alternation in Song 5, bars 30-33

Example 4.12d: Whole-tone alternation in Song 5, bars 36-41

Example 4.13a: Wedge formations in Song 1

β to γ , bars 14-15
Sum 11 Sum 8

outward inward outward inward

bars 17-24, Sum 4

bars 20-24, voice

Sum 10

Example 4.13b: Wedge formation in Song 2
 bars 3-4, voice

Sum 10 PI dyads

Sum 11 PI dyads

Example 4.13c: Wedge formation in Song 3
 bars 11-16 Sum 11

Example 4.13d: Wedge formation in Song 4

bars 25-28, voice

Sum 6 PI dyads

Example 4.13e: Wedge formations in Song 5

Sum 0 PI dyads

Sum 11 PI dyads

bars 25-26, glockenspiel

Sum 8

Bars 30-31

(4-25) (4-25)

Bars 39-42

(4-25) (3-12)

Example 4.14a: Tritones in pc sets 4-9, 4-25 and 4-28

Example 4.14b: 'Alternating interval' cycle schemata

Octatonic (8-28) from two interval-3 cycles

Hexatonic (6-20) from two interval-4 cycles

4-9 and 4-25 from two interval-6 cycles

6-30 from three interval-6 cycles

Example 4.15a: Tetrachordal TINVs in the octatonic scale

4-9s (0,1,6,7) 4-25s (0,2,6,8) 4-28s (0,3,6,9)

Example 4.15b: Other complementary tetrachords in the octatonic scale

4-3s (0,1,3,4) 4-10s (0,2,3,5) 4-12s (0,2,3,6)

4-13s (0,1,3,6) 4-17s (0,3,4,7) 4-18s (0,1,4,7)

4-27s (0,2,5,8) 4-26s (0,3,5,8) 4-21s (0,1,4,6)

4-22s (0,1,3,7)

Example 4.16a: The octatonic motive III, Song 1, bars 1-14

octatonic Coll 3

Example 4.16b: The β to γ octatonic shift, Song 1, bars 14-15

β γ

octatonic Coll 1 octatonic Coll 2

Example 4.16c: Octatonic motives in Song 1, bars 29-32

octatonic Coll 1

Example 4.16d: Octatonic constructions in Song 2

Coll 1

voice, b1 (retrograded) (up 8ve)

voice, b5 (B-Bb reversed) (up 2 8ves)

Bsn/vlas bb 4-5

Horn bb 3-4

Coll 2

Cello b4

hp/cl b4

voice/cellos (up 2 8ves) bb 9-10

celesta bb 8-9

wind bb 8-11

Example 4.16e: An octatonic collection in Song 3, bars 8-11

Coll 2, oboe

voice

C.A./trbne

pc set 4-28

strings

flutes/horns

violins

Example 4.16f: Octatonic associations in Song 4

Coll 1, bars 1-7

flute (8-me)

voice

C. Angler's

Coll 2, bars 26-28

clarinet

flute

Coll 1, bars 28-31

flute

Example 4.16g: An octatonic grouping in Song 5, bars 30-33

δ

β

Coll 1

α

Example 4.16h: An octatonic grouping in Song 1, bars 46-47 and 49

β

β

Coll 1

pedal G

pedal G

Example 4.17a: The pc set 4-28 passage in Song 3, bars 11-15

Example 4.17b: A 12-note aggregate in Song 4, bars 20-21

Example 4.18: The dyads C-Db, E-F and G-Ab in Song 5, bars 23-29

Example 4.19: Interval-5 and interval-1 cycles in bars 7-11 of Song 5

Example 4.20: Major triads in Song 1, bars 20-22

Example 4.21: Self-complementing tetrachords in pc set 8-23

Handwritten musical notation for Example 4.21, showing six tetrachords in pc set 8-23. The notation is arranged in two rows of three. Each tetrachord is represented by a sequence of four notes on a staff, with a bracket above indicating the set and its pitch-class (pc) set number. The tetrachords are:

- 4-11s (0, 1, 3, 5)
- 4-13s (0, 1, 3, 6)
- 4-16s (0, 1, 5, 7)
- 4-23s (0, 1, 5, 8)
- 4-21s (0, 2, 4, 6)
- 4-27s (0, 2, 5, 8)

Example 4.22: Metrically-congruent motives in Song 1, bars 1-5

Handwritten musical notation for Example 4.22, showing metrically-congruent motives in Song 1, bars 1-5. The notation is arranged in four staves, each representing a different instrument or voice part:

- V piano**: Treble clef, 2/8 time signature. Notes: G4, A4, B4, C5.
- III flutes, 2nd oboes**: Treble clef, 4/8 time signature. Notes: G4, A4, B4, C5.
- IV celesta 8ve**: Treble clef, 3/8 time signature. Notes: G4, A4, B4, C5.
- II trumpets**: Treble clef, 3/16 time signature. Notes: G4, A4, B4, C5.

Brackets on the right side of the notation indicate the following intervals:

- 5-5 (between V piano and III flutes, 2nd oboes)
- 7-5 (between IV celesta 8ve and II trumpets)
- 12-note aggregate (encompassing the entire set of notes across all parts)

Example 4.23: Sum 4 and Sum 10 PI dyads in Song 1's opening bars

Handwritten musical notation for Example 4.23, showing Sum 4 and Sum 10 PI dyads in Song 1's opening bars. The notation is arranged in two staves:

- Sum 4**: Treble clef, 2/8 time signature. Notes: G4, A4, B4, C5.
- Sum 10**: Treble clef, 3/8 time signature. Notes: G4, A4, B4, C5.

Brackets and labels indicate the following intervals:

- I (lower notes) and III (upper notes) for the Sum 4 dyad.
- III (lower notes) and IV (upper notes) for the Sum 10 dyad.

Example 4.24: Whole-tone blocks in bars 7-9, Song 1

Handwritten musical score for Example 4.24, showing three systems of piano accompaniment. The first system has three staves with notes and fingerings (4-2, 5-1, 4-2, 1-5). The second system has three staves with notes and fingerings (4-2, 3-8). The third system has four staves with notes, fingerings (4-2, 3-8), and a 'non-whole-tone' annotation. The score is written in treble clef with a key signature of one sharp (F#).

Example 4.25: δ related to II and IV, Song 1

Handwritten musical score for Example 4.25, showing a single system of piano accompaniment. The first staff has notes and fingerings (II, T-11, IV, T-1). The second staff has notes and fingerings (4, 7, 6, 7). The score is written in treble clef with a key signature of one sharp (F#).

Example 4.26: Sum 0 PI dyads in bars 8-9 of Song 1

Example 4.27: Interval-5 cycle arrangements of Sums 0 and 11

Example 4.28: Alternating E-G and C-E in the piano, Song 1, bars 15-16

Example 4.29: Sums 4/10 symmetries, Song 1, bars 25-26

Sum 10 PI dyads

Sum 4 PI dyads

Example 4.30: Sum 10 'resolution', Song 1, bars 34-35

Sum 10 PI dyads

Example 4.31: Wedge formations and whole-tone shifts, Song 1, bars 22-24

W.W. Sum 10

Sum 10

Sum 4

Example 4.32a: A whole-tone and diatonic basis for the brass chords, Song 1, bars 27-29

Horns augmented triads rising by whole tone

Trumpets

Trombones diatonic 6-32s | hexatonic 6-20

Example 4.32b: A hexatonic basis for the motive IX transpositions, Song 1, bars 25-29

Handwritten musical notation on two staves. The notation includes various accidentals (sharps, flats, naturals) and a bracketed section labeled "(Octatonic)".

Example 4.32c: '6-7' system and octatonic 4-9s, Song 1, bars 28-29

Handwritten musical score for "The Rose Tree" featuring three octatonic collections. The score is written on three staves. The first staff has a treble clef and a key signature of one flat (B-flat). The second staff has a treble clef and a key signature of one flat. The third staff has a bass clef and a key signature of one flat. The music is divided into three sections by vertical dashed lines. The first section is labeled "octatonic Coll 1" and contains a melody starting on B-flat and a bass line starting on B-flat. The second section is labeled "octatonic Coll 2" and contains a melody starting on B-flat and a bass line starting on B-flat. The third section is labeled "octatonic Coll 1" and contains a melody starting on B-flat and a bass line starting on B-flat. The score includes various musical notations such as notes, rests, and accidentals. There are also handwritten annotations like "w.w.", "vls.", "4-9", "IX", "X", "IV", "6-7", "II harmonization", and "octatonic Coll 1".

Example 4.33: Whole tone/octatonic interaction in Song 5, bars 30-34
 (from Examples 4.72c and 4.76g) Octatonic Coll 1

Handwritten musical notation for Example 4.33. The notation is on a grand staff with treble, middle, and bass clefs. It includes various musical symbols like notes, rests, and accidentals. A bracket labeled "whole-tone alternation" spans the bottom staff. Above the staff, there are handwritten labels "Octatonic Coll 1" and "4-25-7".

Handwritten musical notation for Example 4.33. The notation is on a grand staff with treble, middle, and bass clefs. It includes various musical symbols like notes, rests, and accidentals. A bracket labeled "whole-tone alternation" spans the bottom staff. Above the staff, there are handwritten labels "Octatonic Coll 1" and "4-25-7".

A major triad

Example 4.34a: Sum 9 PI dyads in the Song 3 twelve-note chord

Handwritten musical notation for Example 4.34a. The notation is on a grand staff with treble and bass clefs. It includes various musical symbols like notes, rests, and accidentals. A bracket labeled "Sum 9" is above the staff.

Example 4.34b: Sum 9 PI dyads in the voice, Song 3

Sum 9

7-31 (octatonic)

Symmetrical about E/F

Example 4.35: Sum 5 symmetries in the Song 3 twelve-note chord, plus an extension and

anticipation in bars 8-9 and bar 16

Sum 5

Symmetrical about G#1/A

violes. bar 16

Clarinet, bars 8-9

Symmetrical about D-Eb

8-9

Example 4.36: Octatonic/hexatonic dualism, Song 4, bars 1-9

Octatonic Coll 1

Fl.

voice

4-17

3-3

Fl.

4-17

C.A.

Hexatonic Coll D

3-3

3-3

4-17

Hexatonic Coll B

Example 4.37: The transformation of PI dyads from Sums 9/3 to Sum 5, Song 4

voice
4-17 C.A. flute

Bars 1-7 Sum 3
about D \flat -D

octatonic Coll 1

Bars 27-32 Sum 9
PI dyads

voice

flute

Sum 5
octatonic Coll 2

octatonic Coll 1

Example 4.38: Sum 8 and Sum 0 inversionsal schemata, Song 5

Handwritten musical notation for two examples, 'Sum 8' and 'Sum 0', illustrating pitch class sets and dyads. The notation is on a single staff with a treble clef and a key signature of one flat (B-flat).

Sum 8: The first example shows a sequence of notes: B-flat, A, G, F, E, D, C, B-flat. Annotations include 'final pitch of $\delta + \beta$ ' under the first note, 'falling 6th' under the interval between the first and second notes, and 'initial dyad, β ' under the interval between the last two notes. Above the staff, 'terminal dyads, δ & ϵ ' is written, with dashed lines connecting the first and second notes, and the last two notes.

Sum 0: The second example shows a sequence of notes: B-flat, A, G, F, E, D, C, B-flat. Annotations include 'grouping from $\delta + \epsilon$ ' under the interval between the first and second notes, and 'initial dyad, β ' under the interval between the last two notes. Above the staff, 'terminal dyads, δ & ϵ ' is written, with dashed lines connecting the first and second notes, and the last two notes.

Example 4.39: Points of elision/sequential repetition, Song 5

bars 5-7 bars 9-11 bars 12-16

3, note 5 α, note 1 δ, notes 11, 12 E, notes 1, 2 E, notes 7, 8 3, notes 1, 2

bars 16-20 bar 21 bar 22 bar 26

3, notes 3, 4, 5 δ, notes 1, 2, 3 δ, note 4 β, note 5 δ, note 6 β, note 5 α, note 8 δ, note 1

bar 26 bar 28 bar 33 bars 35-36

β, note 3 α, note 4 β, notes 3, 2, 1 δ, notes 2, 3, 4 (C.A.) δ, note 9 β, note 1 β, note 5 E, note 2 (no note)

bars 39-40

3, notes 3, 4, 5 δ, notes 1, 2, 3

Example 4.40a: Semitonally-descending links between motives, Song 5, bars 15-29

The image shows a handwritten musical score for Example 4.40a, titled "Semitonally-descending links between motives, Song 5, bars 15-29". The score is written on two systems of staves, each with a piano (piano) and vocal (voice) part.

System 1 (Bars 15-29):

- Piano Staff:** The notation shows a series of chords and single notes. A handwritten note "end of δ " is written above the first few notes. A dashed line with the text "Parallel major thirds" spans across the staff. Below the staff, there is a boxed-in sequence of notes labeled " δ at T-S, notes 1, 3, 4".
- Vocal Staff:** The notation shows a series of notes, some with accidentals. A handwritten note " β " is written above the first few notes.

System 2 (Bars 15-29):

- Piano Staff:** The notation shows a series of chords and single notes. A handwritten note " δ notes 4, 5" is written above the first few notes. A dashed line connects the first few notes of the piano staff to the first few notes of the vocal staff. A handwritten note " β " is written below the first few notes. A handwritten note " β " is written below the last few notes. A handwritten note "modified β " is written below the last few notes.
- Vocal Staff:** The notation shows a series of notes, some with accidentals. A handwritten note " β " is written above the first few notes. A handwritten note " β " is written above the last few notes. A handwritten note "(β)" is written above the last few notes.

Handwritten musical notation for guitar on three staves. The top staff has a treble clef and a key signature of one flat. It contains a sequence of notes with accidentals and a "d start" annotation. The middle staff has a treble clef and contains notes with accidentals and a "d start" annotation. The bottom staff has a bass clef and contains a "Bend" annotation and a "d start" annotation.

Example 4.40b: Semitonally-descending links between motives Song 5, bars 36-50

part of B chord

2nd 3rd chord

E in cellos in trombones

of conclusion

of conclusion

B

of start

part of 7

semitonally - falling lines combine with rising ones, not shown

Musical Examples for Chapter 5: The Four Pieces for clarinet and piano, Opus 5

Example 5.1a: The *initial phrase*, Piece No. 1

Example 5.1b: The *initial phrase* reordered, Piece No. 2

Example 5.1c: The *initial phrase* reordered, Piece No. 3

Example 5.1d: The *initial six notes*, Piece No. 4

Example 5.2a: A variant of the initial six notes, Piece No. 1, bar 9

(pno.)

1 2 3 6-244+

T-8:

4 6 5

Example 5.2b: The *initial phrase* regrouped, Piece No. 2, bars 6-8

(cl.) > 8-229

f p pp ppp

(pno.)

T-2: 3 8 6 7 4 8 2 5 6 5 6 5 PPP 6

Example 5.2c: The *initial phrase* regrouped, Piece No. 3, bars 15-18

(pno.) 8-229 (less F#) (pno.)

PPP (cl.)

T-0: 6 5 PP b 3 7 4 8 - - 6 2 PPP 7

Example 5.2d: The initial six notes reordered, Piece No. 4, bars 18-19

(cl.) 3

(pno.) pp

T-0: 3 6 5 - 1 4 3 2 -

Example 5.3: Intervallic cells in the *initial phrase*

Handwritten musical notation for Example 5.3. The staff shows twelve intervallic cells, each labeled with a Roman numeral and a range in parentheses: I (3-1), II (3-4), III (3-3), IV (3-5), V (3-11), VI (3-12), VII (3-10), VIII (3-7), IX (3-9), X (3-8), XI (3-2), and XII (3-6). Each cell is represented by a specific interval on a staff with a treble clef and a key signature of one flat.

Example 5.4a: Three-note cell shapes (first occurrences, in Piece No. 1 unless otherwise

stated)

Handwritten musical notation for Example 5.4a, showing the first occurrences of three-note cell shapes. The staff is divided into eight measures, each containing a three-note cell shape labeled with a Roman numeral and a letter (a, b, c, d) and a range in parentheses. The labels are: Ia (b.1), Ib (b.4), Ic (b.3), IIa (b.1), IIb (b.2), IIc (b.3), IId (b.3-4), IIIa (b.1), IIIb (b.3), IIIc (b.7), IVa (b.1), IVb (b.6), IVc (b.6), IVd (b.5), Va (b.1), Vb (b.4), Vc (b.1), Vd (b.1-2), VIa (b.1), VIb (b.4), VIIa (b.1), VIIb (b.4), VIIc (b.4), VIIIa (b.1), VIIIb (b.9), and VIIIc (b.8). Each cell is represented by a specific interval on a staff with a treble clef and a key signature of one flat.

No. 4, b. 8

IXa bb.1-2 IXb $\frac{b}{\flat}$ b.4

Xa b.1 Xb $\frac{b}{\flat}$ b. Xc No.2, b.5 Xd No.2, b.2 Xd $\frac{b}{\flat}$

XIa bb.1-2 XIb b.5 XIc b.4 XId $\frac{\sharp}{\sharp}$ b.7

XIIa bb.1-2 XIIb $\frac{b}{\flat}$ b.8

Example 5.4b: Four-note cell shapes (first occurrences, in Piece No. 1 unless otherwise stated)

4-215 b.3 4-11 b.4 4-13 No.3, b.1 4-16a b.2

4-16b b.4 4-19a $\frac{b}{\flat}$ 4-19b b.4 4-19c b.6

4-5 b.2 4-20 $\frac{\sharp}{\sharp}$ No.4, b.2 4-27 No.2, b.5 4-21 No.2 b.4

4-6 b.4

Example 5.4c: Five-note cell shapes (first occurrences)

Handwritten musical notation for Example 5.4c. The first staff contains three measures: the first measure is labeled "4-22" and "No. 1, bb. 1-2"; the second measure is labeled "5-3" and "No. 1, bb. 7-8"; the third measure is labeled "5-217" and "No. 1, b. 6". The second staff contains one measure labeled "5-34" and "No. 2, b. 4".

Example 5.5a: Cell Ia ($1^{\wedge}2$) as a motive

Handwritten musical notation for Example 5.5a. The notation shows four staves with various accidentals and interval markings. The first staff has markings "No. 1", "b. 2", "b. 3", and "b. 6". The second staff has "bb. 4-5", "bb. 7-8", "b. 9", "b. 9", and "b. 9". The third staff has "No. 4", "b. 5", "b. 7", "b. 7", "b. 18", and "b. 7". The fourth staff has "b. 3" and "b. 6".

Example 5.5b: Cell IIb (1-4) as a motive

Handwritten musical notation for Example 5.5b. The notation shows four staves with various accidentals and interval markings. The first staff has "No. 1", "b. 2", "b. 3", "b. 5", and "b. 7". The second staff has "b. 7". The third staff has "No. 3", "b. 1", and "b. 5". The fourth staff has "No. 4", "b. 5", "b. 5", and "b. 7".

Example 5.5c: Cells 4-16a, 4-5 and Xa as motives

Handwritten musical notation for Example 5.5c, showing three numbered examples (No. 1, No. 3, No. 4) illustrating motives derived from cells 4-16a, 4-5, and Xa.

No. 1 b. 2: Shows a melodic line with notes marked with flats (b) and a measure labeled 4-5. Below the staff, there are markings for 4-16a and Xa.

No. 3 b. 5: Shows a melodic line with notes marked with flats (b) and a measure labeled 4-5. Below the staff, there are markings for 4-16a and Xa.

No. 4 b. 18-19: Shows a melodic line with notes marked with flats (b) and a measure labeled 4-5. Below the staff, there are markings for 4-16a and Xa.

Example 5.5d: Cell XIIb (10^1) as a motive

Handwritten musical notation for Example 5.5d, showing three numbered examples (No. 1, No. 2, No. 4) illustrating motives derived from Cell XIIb (10^1).

No. 1 b. 5: Shows a melodic line with notes marked with flats (b) and a measure labeled 4-5. Below the staff, there are markings for 4-16a and Xa.

No. 2 b. 1: Shows a melodic line with notes marked with flats (b) and a measure labeled 4-5. Below the staff, there are markings for 4-16a and Xa.

No. 4 b. 18-19: Shows a melodic line with notes marked with flats (b) and a measure labeled 4-5. Below the staff, there are markings for 4-16a and Xa.

Example 5.6a: VIIIa, IIIb and 4-Z15 in Piece No. 1

Handwritten musical notation for Example 5.6a, showing two numbered examples (No. 1, No. 2) illustrating motives derived from VIIIa, IIIb, and 4-Z15 in Piece No. 1.

No. 1 b. 3: Shows a melodic line with notes marked with flats (b) and a measure labeled 4-5. Below the staff, there are markings for 4-16a and Xa.

No. 2 b. 7: Shows a melodic line with notes marked with flats (b) and a measure labeled 4-5. Below the staff, there are markings for 4-16a and Xa.

Example 5.6b: 4-19b/5-Z17 in Piece No. 1

Example 5.6c: Cell VIIb in Piece No. 3

Example 5.6d: Cells IVc, IIIc and VIIIc, Piece No. 4

Example 5.7a: Arpeggiated and triadically-formed cells

Example 5.7b: The IVa and 4-16b cells in quartal harmonies

Example 5.7c: Cell IIIa in Pieces 2, 3 and 4

Example 5.7d: Cell Ib in Pieces 1 and 4

Example 5.7e: Cell XIc in Pieces 1 and 3

Example 5.7f: Cell Xc in Pieces 3 and 4

bb. 7-8 bb 9-10

Example 5.7g: The 5-3 cell in Pieces 1 and 4

b. 12 b. 9

Example 5.7h: Cell Vd in Pieces 1 and 4

bb 1-2 bb 15-16

Example 5.7i: Cell VIa in Pieces 2 and 3

b. 8 b. 1

Example 5.8a: Pc set 5-20 correspondences

(4-20/4-16) 4-16a/(4-20)

(4-8)/4-16b 4-16b/(4-14) (4-8)/4-16b

T-T

No. 2 $b.1$ $b.1$ $b.1$

(4-14/4-16) $T-0$ $\text{II}a$

No. 4

(cl.) (cl.)

4-20 4-20

Example 5.8b: Pc set 5-24 correspondences

No. 1 $b.8-9$ (4-21/4-22) $\text{XII}bs$ No. 4 $b.9$ (4-21/4-22) $\text{XII}bs$

No. 1 $b.7$ (4-16/4-22/4-229) No. 3 $b.12$ (4-229/4-21) No. 4 $b.9$ (4-22/4-11/4-229)

Example 5.8c: Pc set 5-34 correspondences

No. 2 $b.4$ No. 3 $b.3$

(4-21/4-27) $T-8$ (4-21/4-27)

No. 1 $bb.1-2$ (4-22/4-22) $T-6$ (4-22/4-27) No. 4 $bb.15-16$ (4-22/4-27) $b.9$

Example 5.8d: Pc set 5-31 correspondences

No. 3 $bb.1-2$ (4-13/4-27) $T-11$ (4-27/4-13) No. 4 $b.7$

No. 2 $b.5$ No. 3 $b.b.9-12$

 (4-27/4-28) (4-18/4-27)

Example 5.8e: Pc set 5-7 correspondences

No. 1 $b.4$ No. 3 $b.16$ (cl.)

 (4-6/4-16b)

No. 1 $b.12$ No. 4 $b.b.6-7$

 (4-8/4-6) (4-6/4-8)

No. 1 $b.2$ No. 3 $b.18$ (cl.)

 (4-5/4-16a) (T-11) 4-5

No. 3 $b.15$

 (4-8)

No. 4 $b.6$

 (4-6/4-8) (4-9/4-5)

Example 5.8f: Pc set 5-21 correspondences

No. 1 $b.2$ No. 3 $b.7$

 (4-27) (4-20/4-19)

Handwritten musical notation for Example 5.8g. It features two staves. The top staff has notes with annotations 'No. 1 b.7', '5-21', and 'No. 3 b.1'. The bottom staff has notes with annotations '(4-19/4-20/4-26)', '5-21', and '(4-19/4-17)'. Arrows indicate correspondences between notes on the two staves.

Example 5.8g: Pc set 5-27 correspondences

Handwritten musical notation for Example 5.9a. It features two staves. The top staff has notes with annotations 'No. 1 b.7' and 'No. 4 b.17'. The bottom staff has notes with annotations '5-27', '4-20/4-20', and '(4-14/4-20)'. Arrows indicate wedge-movements between notes.

Example 5.9a: Wedge-movements in bars 1-2 of Piece No. 1

Handwritten musical notation for Example 5.9b. It features a single staff with notes. Below the staff are annotations 'Sum 3', 'Sum 6', and 'Sum 6 (bar 2)'. Arrows indicate wedge formations between notes.

Example 5.9b: Wedge formations in the clarinet, bars 7-9, Piece No. 1

Handwritten musical notation for Example 5.10a. It features a single staff with notes. Above the staff is the annotation 'Sum 4 PI dyads'. Below the staff are annotations 'Sum 2 PI dyads' and '8ve'. Arrows indicate an asymmetrical wedge formation between notes.

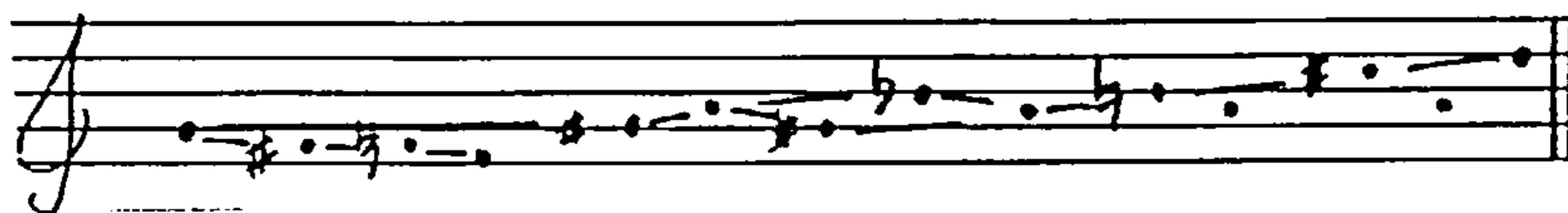
Example 5.10a: An asymmetrical wedge in Piece No. 1, bars 3-4

Handwritten musical notation for Example 5.10b. It features a single staff with notes. Below the staff is the annotation 'Sum 6'. Arrows indicate an expanding movement of parts between notes.

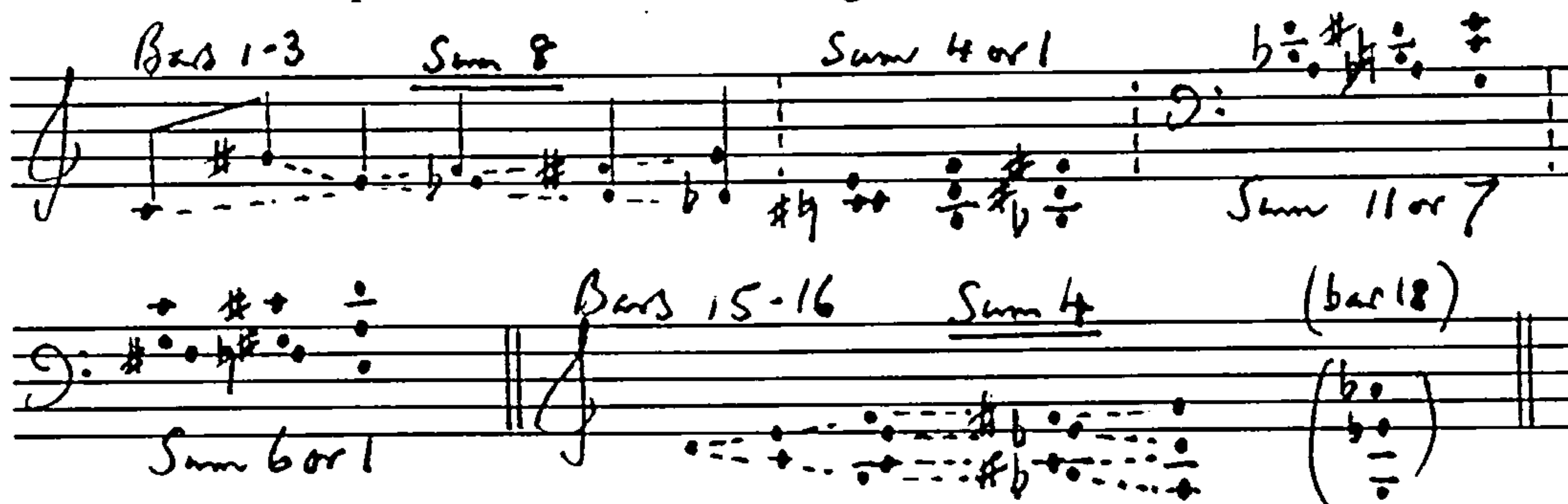
Example 5.10b: Expanding movement of parts, Piece No. 1, bar 5

Handwritten musical notation for Example 5.10c. It features two staves. The top staff has notes with annotations '(bar 6)' and '(b.6)'. The bottom staff has notes with annotations 'Sum 6' and '(b.6)'. Arrows indicate an expanding movement of parts between notes.

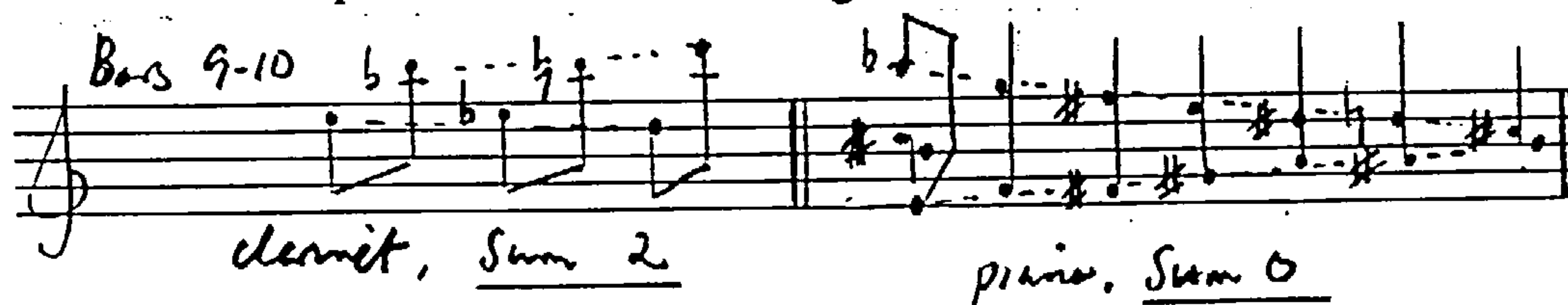
Example 5.10c: Widening wedges in the piano, Piece No. 1, bars 7-9



Example 5.11a: Inversional wedge movements in Piece No. 3



Example 5.11b: Inversional wedge movements in Piece No. 4



Example 5.12a: Passages of whole-tone alternation



No. 4 bars 6-7

bars 18-19

Example 5.12b: Whole-tone-plus foreign-note harmonies

No. 1 bar 4 bars 7-8

No. 2 bars 2-4 bar 5

No. 3

bars 1-3

(w.t.)

bar 3

bars 5-6

bar 12

No. 4

bar 8

Example 5.13a: Pc set 4-9s

No. 1 bar 6

No. 4 bar 6

Example 5.13b: Pc set 6-20s and 9-12s

No. 1 bar 2

bar 7

bars 8-9

6-20

76

9-12

9-12

Handwritten musical notation for a complex piece, featuring multiple staves with notes, rests, and various annotations including Roman numerals (Ia, IIa, IIIa, IVa, Vb, VIb, VIIa, VIIIa, IXa, Xa, XIa, XIIa) and interval markings (4-215, 6-5, 5-7, 4-5, 5-6, 4-6, 5-7).

Example 5.16a: Cells I-VI in the *initial phrase's* 6-Z44

Handwritten musical notation showing six cells (Ia through VIa) with their corresponding fingerings (1, 3, 4; 1, 2, 3; 1, 4, 5; 1, 2, 4; 1, 5, 2; 1, 5, 6).

Example 5.16b: 'Referential pitch pair' tetrachords in Piece No. 1, bars 1-5

Handwritten musical score for Example 5.16b, showing two systems of music. The notation includes various tetrachord labels and pitch markers:

- System 1 (top):
 - Annotations: $8-229$, $bb.1-2$, $4-5$, Ia , $4-16$, $4-5$, $bb.3-4$, $4-215$.
- System 2 (bottom):
 - Annotations: $4-16$, $4-229$, Ia , $b.5$, $8-215$, $4-16$, $4-229$, Ia , $8-215$.

* single referential pitches

Example 5.16c: 'Referential pitch pair' tetrachords in the *initial phrase's* 8-Z29

Handwritten musical score for Example 5.16c, showing four systems of music. The notation includes specific tetrachord labels:

- System 1: $4-5s$ (all have Ab)
- System 2: $4-16s$ (all have D)
- System 3: $4-215s$
- System 4: $4-229s$

Example 5.17: The chord sequence in Piece No. 2, bars 4-6

Bb^{m3} F^9 Ab^{m9} A^{m9} Bb^7 B^{m13} Ab^{13} $Db^{(7)}$ Ab^7 $Db^{(7)}$
 (D) (V⁷) → (I) (V⁷) X(I)

Example 5.18: Pc set 4-19 and 5-21 textures in Piece No. 1, bars 3-5

b.3 b.4 b.5
 4-19 4-19 5-21 4-19s 4-19

Example 5.19a: Transpositions of elements, Piece No. 1, bar 9

T-2 / RI-6
 b.9
 T-2 / RI-6
 T-2 / RI-6
 T-2 / RI-6

Example 5.19b: Eb-A and F#-C tritones as elements at the start of each section of Piece No.

pc set 4-5, bar 1 pc set 4-5, bar 6 pc set 4-16, bar 9

Example 5.20a: 8-Z29 and 8-Z15 compared

5-33 8-Z29 (initial phase) 5-33 8-Z15

3-8 T-6 3-8

8-Z29 from 8-9 8-Z15 from 8-9

8-Z15 (T-7) 8-Z15 in bar 5, Piece No. 1

3-8 3-8-1 (Xa)

Example 5.20b: 6-Z19 and 6-Z44 compared

6-20 3-12 6-Z19 3-8 6-Z44 3-8

3-12 3-12 3-12

6-20 6-Z19 6-Z44

Piece No. 4

6-2 6-3 6-35

Example 5.20c: The complementary 6-Z19 and 6-Z44 compared

6-Z19 3-12 6-Z44 3-12 = 12 note aggregate

6-35 3-12 6-35 3-8 = 12 note aggregate

3-12 3-8 3-8

Example 5.20d: 4-Z15 and 4-Z29 compared

Handwritten musical notation for Example 5.20d, comparing 4-Z15 and 4-Z29 across five staves. The notation includes various intervals, tritones, and minor thirds, with handwritten annotations explaining the relationships between the sequences.

- Staff 1:** Shows 4-Z15 (3-8) and 4-Z29 (3-8) sequences.
- Staff 2:** Shows 4-Z15 and 4-Z29 sequences with tritone and minor 3rd intervals highlighted.
- Staff 3:** Shows 8-28, 4-Z15, and 4-Z29 sequences. Annotations include "tritones from each = 4-28" and "minor 3rds from each = 4-28".
- Staff 4:** Shows 8-25, 4-Z15, and 4-Z29 sequences. Annotations include "tritones from each = 4-25" and "minor 3rds from each = 4-28".
- Staff 5:** Shows 8-9, 4-Z15, and 4-Z29 sequences. Annotations include "minor 3rds from 4-Z15s", "tritones from each", "minor 3rds = 4-28 from 4-Z29s", and "= 4-9".

Example 5.21: Hexatonic Sequences A and B in Pieces 1, 3 and 4

Handwritten musical notation for Example 5.21, showing Hexatonic Sequences A and B in Pieces 1, 3, and 4. The notation includes various intervals and sequences, with handwritten annotations explaining the relationships between the sequences.

- Staff 1:** Shows No. 1, 6-2, 7-21, and A/B sequences.
- Staff 2:** Shows 6-244 sequence.
- Staff 3:** Shows 6-20 sequence.
- Staff 4:** Shows 5-21 and 5-21 sequences.

No. 3 b.1 A/B bb2-3 r6-2197 r6-207 r6-2197 r6-317

No. 4 b.1 A/B b.2 6-20 6-31 6-244 b.3 6-219

Example 5.22: Sequence C opposed to Sequences A and B in Piece No. 1

b.2 C (5-7)

b.9

A (6-20)

B (6-244)

C (6-7)

(Ia)

(Ia)

(Ia)

Example 5.23: Pc sets 4-9, 4-25 and 4-28 in pc set 6-30

Example 5.23 shows a musical staff with a treble clef and a key signature of one flat. The staff contains a sequence of notes: Bb, Ab, Gb, F, E, D. Above the staff, the set is labeled 6-30. Below the staff, the notes are grouped into four tetrads, each labeled with a Pc set number and a description of its intervallic structure: 4-9 (tritone), 4-25 (tritone a semitone apart), 4-25 (tritone a tone apart), and 4-28 (tritone a minor 3rd apart).

Example 5.24: Sequence F in Piece No. 1, bar 2

Example 5.24 shows a musical staff with a treble clef and a key signature of one flat. The staff contains a sequence of notes: Bb, Ab, Gb, F, E, D. Above the staff, the sequence is labeled F. Below the staff, the notes are grouped into several tetrads, each labeled with a Pc set number: 7-15, 6-22, 5-24, 5-9, 4-5, and 4-16.

Example 5.25: Sequences G and C in Piece No. 1, bar 3

Example 5.25 shows a musical staff with a treble clef and a key signature of one flat. The staff contains a sequence of notes: Bb, Ab, Gb, F, E, D. Above the staff, the sequence is labeled G. Below the staff, the notes are grouped into several tetrads, each labeled with a Pc set number: 6-244, 5-6, 4-215 (coll), 4-5, 5-7, and 1a.

Example 5.26: Sequence H in Piece No. 1, bars 8-9

Example 5.26 shows a musical staff with a treble clef and a key signature of one flat. The staff contains a sequence of notes: Bb, Ab, Gb, F, E, D. Above the staff, the sequence is labeled H. Below the staff, the notes are grouped into several tetrads, each labeled with a Pc set number: 6-34, 7-26, 7-13, 8-19, and 8-24.

Example 5.27: Sequences A and I in Piece No. 1, bar 3

Handwritten musical notation for Example 5.27, bar 3. The notation is on a grand staff with treble and bass clefs. It features several sequences labeled with numbers and letters. Sequence A is marked with a bracket above the staff, spanning measures 1 and 2, with the label '6-20 A'. Sequence I is marked with a bracket below the staff, spanning measures 1 and 2, with the label 'I'. Other sequences include '4-19', '3-12', '4-19', '5-21', and '7-21'.

Example 5.28: Sequences C, F and I in Piece No. 1, bar 4

Handwritten musical notation for Example 5.28, bar 4. The notation is on a grand staff with treble and bass clefs. It features several sequences labeled with numbers and letters. Sequence C is marked with a bracket above the staff, spanning measures 1 and 2, with the label 'C'. Sequence F is marked with a bracket below the staff, spanning measures 1 and 2, with the label 'F'. Other sequences include '4-229', '6-34', '3-12', '4-19b', '7-34', '7-13', '5-9', '4-229', '5-24', '5-21', '5-23', '7-15', '5-7', '4-16b', '4-6', '6-244', and 'I'. The notation also includes a 'pno.' marking and a 'cell' marking.

Handwritten musical score for "The Rose Tree" (Op. 10, No. 10 by J. S. Bach). The score is written on three systems of staves. The first system includes parts for Clarinet (cl.), Piano (pno.), and Bass (b.). The second system continues the piano and bass parts. The third system shows a single melodic line. The score is heavily annotated with figured bass notation (e.g., 4-215, 5-21, 7-21, 6-12, 7-9, 6-12, 5-13, 7-13, 4-215, 5-15, 7-26, 6-21, 7-13, 8-5, 4-215, 4-16, 8-215) and dynamic markings (f, pno.). The piece is in 3/4 time and G major.

Handwritten musical score for three systems (H, I, F) with various musical notations and annotations.

System H: Labeled with **b.5** and **6.6 7-21 A2/B**. It features a treble clef with a key signature of one flat (B-flat). The notation includes a series of notes with stems and beams, and a large bracketed section labeled **4-17** and **5-21**. A **(pna)** marking is present. The bass line is indicated by a **9:** marking.

System I: Continues the notation from System H, featuring a treble clef and a key signature of one flat. It includes a **5-21** marking and a **6-14** marking. A **7-22** marking is also present.

System F: Labeled with **6.7**. It features a treble clef and a key signature of one flat. The notation includes a series of notes with stems and beams, and a large bracketed section labeled **6-31** and **5-24**. A **7-26** marking is also present.

The score is written on a three-staff system, with the top staff containing the main melody, the middle staff containing a secondary melody or accompaniment, and the bottom staff containing a bass line or figured bass. The notation is highly detailed, with many notes, stems, and beams, and includes various musical symbols such as clefs, key signatures, and dynamic markings.

Handwritten musical notation for sequences A and I. Sequence A is in the treble clef, showing a series of notes with intervals 7-21, 6-20, 5-21, 4-19b, and 3-12. Sequence I is in the bass clef, showing notes with intervals 5-21, 6-14, and 6-14. Both sequences are marked with 'b.8' and 'b.9'.

Handwritten musical notation for sequences F and H. Sequence F is in the treble clef, showing notes with intervals 5-24, 6-34, and 6-34. Sequence H is in the bass clef, showing notes with intervals 8-14, 7-13, 7-23, 7-23, 6-22, and 6-34. Both sequences are marked with 'b.9' and 'b.10'.

Example 5.31: Sequences C/F and I in Piece No. 1, bar 9

Handwritten musical notation for sequences C/F and I. Sequence C/F is in the treble clef, showing notes with intervals 7-13, 5-15, and 5-21. Sequence I is in the bass clef, showing notes with intervals 4-16, 5-21, 5-22, 4-19, and 7-237. Both sequences are marked with 'b.9' and 'b.10'.

Handwritten musical score for guitar, featuring two systems of notation. The first system includes chords like C, F/K, B/I, and various intervals such as 5-15, 3-5, 4-16, 4-8, 4-5, 7-13, 6-16, 8-22, 9-6, 8-24, 7-30, 9-9, and 5-7. The second system includes chords like (E), F, K, and intervals like 8-6, 4-8, 5-7, 4-16, and 5-15. The score is written on five staves.

Handwritten musical score for guitar and bass. The guitar part (top staff) is in G major and F (cl) mode, featuring various fretboard diagrams and fingerings. The bass part (bottom staff) is in D major and F major mode, featuring various fretboard diagrams and fingerings. The score is divided into two systems by a double bar line.

Guitar Part (Top Staff):

- System 1 (Left):**
 - Chord: G
 - Fingerings: 4-5, 5-4-5, 4-5, 5-2, 5-2
 - Fretboard diagrams: 4-2-1-5-7, 8-2-2-9, 4-16, 5-20, 6-2-1-9, 5-2-1-8
- System 2 (Right):**
 - Chord: F (cl)
 - Fingerings: 5-2, 5-2, 5-2, 5-2
 - Fretboard diagrams: 5-20, 5-20

Bass Part (Bottom Staff):

- System 1 (Left):**
 - Chord: D
 - Fingerings: 4-5, 5-4-5, 4-5, 5-2, 5-2
 - Fretboard diagrams: 8-5
- System 2 (Right):**
 - Chord: F
 - Fingerings: 5-2, 5-2, 5-2, 5-2
 - Fretboard diagrams: 5-2-1-8, 5-15, 6-2-2, 5-15, 5-3-4, 9-5

[illegible]

Example 5.35: Diatonic Sequence K in Piece No. 2, bar 5

Example 5.36: Sequence J in Piece 3, bars 1-3

Example 5.37: The three chords of Piece No. 3, bars 3-5

Example 5.38: The piano chords in Piece No. 3, bars 6-8

Example 5.39: The central section of Piece No. 3, bars 9-13

Handwritten musical score for Example 5.39, showing two systems of music. The first system is labeled 'G' and 'I' at the top left. It features a treble and bass staff with various notes and rests. Annotations include '6-219', '5-217', '4-19', '3-8 (8a)', '4-10 (IIc)', '3-10', '4-28', '5-10', '4-28', '3-5', '4-16b', '5-20', '5-31', '5-28 (Coll 1)', '8-28', and 'D/J'. The second system is labeled 'D/J' and 'F' at the top left. It also features a treble and bass staff with various notes and rests. Annotations include '3-10', '4-215', '5-10', '3-8', '4-229', '3-8', '5-33', '6-34', '6-34', '4-19', '7-10', '7-21', '4-16', '5-20', '3-5 (8-19) (IIa)', '4-16', '5-30', '4-20', '6-31', '4-22', '4-16b', '4-8', '3-5 (IIa)', '3-5 (IIa)', and 'A/B/C/G/I/K'.

Example 5.40: Sequence C, G and E elements in Piece No. 3, bars 14-18

Handwritten musical score for Example 5.40, showing a single system of music. It features a treble and bass staff with various notes and rests. Annotations include 'cl.', '(E)', 'G', 'Initial phrase', 'C', '5-7', '4-8', '4-6', '3-5', '4-5', '3-8', '4-5', '6-244', '7-20', '8-229', and 'pno'.

Example 5.41: Sequences E, F and K in Piece No. 4, bars 7-10

K/F

cl. \sharp 8-229 (F)

pno. (F) 5-12 4-27 (K/F) (K) 3-7

(F) 5-13 (K) (cell) 4-13 (K) 4-11 (K) 4-22 (K) 4-22 (K) 4-23(F) 4-23 4-25(E) (K) 4-18 (K) 4-18 (K) (F) (K/F)

4-9 (3-55) (F) 3-11 (K) 13-5 (F) 7-24 (K/F)

E/K/F

(F/K) 5-24 5-24 (F/K) (K) 4-11 (K) 4-22 (K) 3-8 (K) 3-7 (F) 4-23 5-9 (F) (F) 4-11 (K) 6-34 (F) (K) 6-34 (F) (K) 7-33 (E) (F) 3-5 (F) 4-25(E) 4-25(E) (F) 3-5 (F)

Example 5.42: Sequence I to F and K in Piece No. 4, bars 13-16

Handwritten musical notation for Example 5.42, showing a sequence of notes with various annotations including (I), (F), (K), (K/F), and numerical figures like 6-14, 5-23, 4-14, 3-11, 3-12, 4-19, 4-22, 4-27, 5-21, 5-34, 6-34, 7-24, and 8-11. The notation is written on a grand staff with a treble clef and a key signature of one sharp (F#). The sequence starts with a whole note F# and continues with a series of half and quarter notes, some of which are beamed together. The annotations are placed above and below the notes, indicating specific intervals or sequences.

Example 5.43: Sequences A2 and B in Piece No. 4, bars 18-19

Handwritten musical notation for Example 5.43, showing two staves with sequences A2 and B. The notation is written on a grand staff with a treble clef and a key signature of one sharp (F#). The sequence starts with a whole note F# and continues with a series of half and quarter notes, some of which are beamed together. The annotations are placed above and below the notes, indicating specific intervals or sequences. The first staff is labeled (A2) and the second staff is labeled (B). The sequence ends with a double bar line.

Musical Examples for Chapter 6

Example 6.1a: Alternating minor thirds and semitones

Op. 2/4 b.b. 12-13

Op. 3/1 3.3/4-17

Op. 3/2 → b = # = =

Op. 4/1 b.15 → b. .

Op. 4/2 b.5, voice

Example 6.1b: Three-note types and triadic derivatives

Handwritten musical notation on three staves. The first staff is in treble clef, key of B-flat major (two flats), and 2/4 time. It contains a melody with notes G4, A4, Bb4, C5, Bb4, A4, G4, and a final Bb4. Above the staff are annotations: "3-5", "Op. 2/4, bb. 20-22", "Op. 5", and "(motive 4-16b)". Below the staff are "8ve lower" and "(motive IVa)". The second staff is in bass clef, key of B-flat major, and 3/2 time. It contains a melody with notes Bb3, A3, G3, F3, E3, D3, C3, and a final Bb3. Above the staff are annotations: "3-8", "Op. 3/1, b. 170", "Op. 3/2, b. 5", "b. 2", "Op. 5/2, b. 2", and "Op. 4/3, b. 9". Below the staff are "(marcato theme)" and "(contrapuntal variant)". The third staff is in treble clef, key of B-flat major, and 5/2 time. It contains a melody with notes G4, A4, Bb4, C5, Bb4, A4, G4, and a final Bb4. Above the staff is the annotation "Op. 5/2, b. 5". Below the staff is the annotation "(4-27 motive)".

3-4 op 2/4, b. 13-14 op 3/2, b. 13 b. 39-40 b 78 op 5/1, b. 7

(diatonic scale figure) (grazioso variant)

b. 4 b. 6 op 5/4, b. 2 #

(cell 4-19b) (cell 5-217) (cell 4-20)

3-4 op 5/2, b. 2 op 5/1, b. 1 b. 7 op 2/4, b. 15

(cell IIa) (cell IIa) (cell 4-19a)

3-5 op 3/2, b. 3 op 4/1, b. 1 op 5/1, b. 6

(anticipatory variant) (motive IX) (cell IXb)

3-5 op 3/2, b. 6 op 4/1 op 5/1, b. 5 op 2/4, b. 15

(mercato theme) (motive V/IX) (cell IXd)

3-2 op 4/1, b. 1 op 5/1, b. 4 b. 6

motive I/VI cell XIc (cell 5-217)

Handwritten musical notation on three staves:

- Staff 1: $3-8$ $\sigma 2/4, b. 11$ $\sigma 5/1, b. 1$
- Staff 2: $3-7$ $\sigma 2/4, b. 12$ $b. 15$ (cell Σa) $b.b. 21-22$ $\sigma 3/2, b.b. 11-12$
- Staff 3: $\sigma 4$ $\sigma 5/1, b. 1$ $\sigma 5/3, b. 1$ (lyrical theme) $\sigma 5/1, b. 3$

Below the staves, the following labels are written:

- (part of β)
- (part of γ)
- (cell $\text{VIII} a$)
- (cell 4-13)
- (cell 4-215)

Example 6.1c: The pc set 3-1 cell shape (1²)

Example 6.1c: the pc set 3-1 cell shape (1²)

Handwritten musical notation on three staves:

- Staff 1: $\sigma 3/1$ $b.b. 3-6$ $b. 4, b.b. 58-9$
- Staff 2: $\sigma 4$ $3-1$ (No. 1, b. 1) δ $\# \cdot \cdot b \cdot$ II motive
- Staff 3: $\sigma 5$ (cell $\text{I} a$)

Example 6.1d: The pc set 3-3 cell shape (1-3)

Handwritten musical notation on one staff:

- $3-3$ $\sigma 3/1, b.b. 10-11$ $\sigma 3/2, b. 1$ $\sigma 3/4, b. 35$ $\sigma 5/1, b. 3$

Below the staff, the following labels are written:

- (a 3 motive)
- (ritornello)
- (motive VII)
- (cell $\text{III} b$)
- (cell XII)

Example 6.1e: The pc set 3-5 cell shape (5-1)

Handwritten musical notation for Example 6.1e. The notation includes pitch classes (3-5, 3/1, 3/2, 4/2, 4/4, 7/12) and intervallic cell shapes (b3, b4 45, sextuplet motive, b.25, E). The notation is written on two staves.

Example 6.1f: Fourths cycle segments

Handwritten musical notation for Example 6.1f. The notation includes pitch classes (3-9, 2/4, bb.20-22, 3/1, bb.2-3, 3/2, b.25, #b.2/2, b.12, bb.13-15, b.49, bb.152-3, 4, 4/1, b.33, 5/1, b.4) and intervallic cell shapes (a1 motive, sextuplet motive, a1 motive, motive VIII, cell IX b). The notation is written on three staves.

Example 3.16: Robert Schumann's 17 segments (1-17)

Handwritten musical score for Example 3.16, Robert Schumann's 17 segments (1-17). The score is written on five staves. The first staff contains segments 1-4, 5-12, and 13-14. The second staff contains segments 4, 4/2, 3-1, 1-3, 3-4, and 4. The third staff contains segments 4, 5, 4-17s, 5b 8-9, 6b 8-9, and 6b 8-9. The fourth staff contains segments 8-11, 4-17s, 5/2, 6-4, 5/3, 5-1, 5/4, 5-5, 6-6, and 6-8. The fifth staff contains segments 8-9 and 13-16. The score includes various musical notations such as notes, rests, and bar lines.

Octatonic/1

Octatonic/5

Octatonic/2

Octatonic/6

Octatonic/3

Octatonic/7

Octatonic/4

Octatonic/8

Handwritten musical notation on a page, organized into two columns of staves. The notation includes various musical symbols such as notes, rests, and accidentals (sharps, flats, naturals). The staves are labeled with handwritten text indicating the type of scale or interval being demonstrated.

Left Column Labels:

- Hexatonic/1
- Whole-tone/1
- Whole-tone/3
- 6-7/1
- 12-note/1
- Semitone/1
- Semitone/3
- Semitone/4

Right Column Labels:

- Hexatonic/2
- Whole-tone/2
- Whole-tone/4
- 6-7/2
- Semitone/2

The notation is written on a series of staves, with some staves containing multiple measures of music. The handwriting is in ink, and the paper shows signs of age and wear.

Semitone/5

Diatonic/1

Diatonic/2

Diatonic/3

Diatonic/4

Diatonic/5

Diatonic/6

Augmented/1 6-30/1

12-note/2 etc.

Example 6.3: Diverging/converging interval cycle patterns

Interval -6 cycle

Octatonic/1 Octatonic/2 Octatonic/3

Interval -5 cycle

6-7/2 D/3 D/2 D/6 D/4 6-7/2 etc.

6-7/2 D/4 D/6 D/2 D/3 6-7/2 etc.

Interval -4 cycle

H/1 H/3 H/2 w.t./2 w.t./1 w.t./2 Augmented/1

H/2 H/1 H/3 w.t./2 w.t./2 w.t./2 w.t./1

Interval -3 cycle

O/4 O/5 O/4 O/5 Octatonic/8

O/7 O/6 O/7 O/6

Interval -2 cycle

S.t./1 D/5 S.t./1 D/5 S.t./1 D/5

D/1 D/1 S.t./2 D/1 D/1 S.t./2

w.t./3 w.t./4 w.t./3 w.t./4

w.t./4 w.t./3 w.t./4 w.t./3

[illegible]

Example 6.4: Single-note modification techniques: 6-Z44/Z19, 6-14, 6-15, 6-16 and 6-31

from 6-20

6-20s in parallel minor 7ths / major 2nds

6-244 6-219

6-20s in parallel tritones

6-14 6-14

6-20s in odd-summed symmetry

6-31 6-31

6-16 6-16

6-15 6-15

Example 6.5a: Single-note modification technique: 8-Z29/Z15 from 8-9

8-95 in parallel major
6ths/minor 3rds

8-229 (initial phrase) 8-215

Example 6.5b: The initial phrase 6-Z44/8-Z29 as Sums 3, 7 and 11 symmetries

Sum 3

Sum 7

Sum 11

6-244

5-21 is 6-244

Example 6.6: six-note TINVs from the odd-summed semitonal wedge

Semitonal (6-1)

6-205

6-305

6-7

whole-tone (6-35)

1 2 3 4 5 6

1 2 5 6 4 3

1 2 4 6 5 3

1 2 3 6 5 4

1 3 5 6 4 2